TRANSCRIPT OF RECORD

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, [redacted]

No. [redacted] 2309

THE UNITED STATES APPELLANT,

vs.

SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS [redacted] CAIL.

No. [redacted] 310

SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS [redacted] CAIL, APPELLANT,

vs.

THE UNITED STATES.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1909.

No. 793.

THE UNITED STATES, APPELLANT,

vs.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL.

No. 794.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, APPELLANT,

vs.

THE UNITED STATES.

APPEALS FROM THE COURT OF CLAIMS.

INDEX.

	Original.	Print.
Petition	1	1
Traverse	8	7
Argument and submission	8	7
Amended petition	9	8
Findings of fact	17	14
Specification	17	14
Patent No. 301220 (De Bange)	18	16
Translation from article in Revue d'Artillerie, August 18, 1878	22	21
Translation from article in Revue d'Artillerie	27	28
Ordnance notes, No. 292, April 20, 1883	30	32
Translation of description of method of making gas checks, etc	36	40
Report of Gun Foundry Board	37	43
Correspondence in reference to use of patent	38	43

	Original.	Print.
Findings of fact—Continued.		
Extracts from Ingersoll's text-book	42	47
Extracts from Metcalf's text-book	42	47
Extracts from Scientific American	42	48
Letter, Pollok & Mauro to Secretary of War, January 31, 1894	44	49
Letter, Secretary of Navy to Pollok & Mauro, February 10, 1894	45	51
Report of Admiral Sampson, December 4, 1894	46	51
Letter, Secretary of Navy to Pollok & Mauro, December 31, 1894	46	52
Patent No. 318093 (Davis)	47	53
Patent No. 539733 (Gerdom)	49	56
Conclusion of law	53	61
Opinion of the court	54	61
Judgment	57	66
Order amending findings, etc	58	67
Application of defendants for and allowance of appeal	59	67
Application of claimant for and allowance of cross-appeal	60	67
Clerk's certificate	61	68

1 In the United States Court of Claims.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL *vs.* THE UNITED STATES.	No. 18796.

I. Petition. Filed January 31, 1895.

To the honorable the Judges of the Court of Claims:

The petition of the Société Anonyme des Anciens Etablissements Cail respectfully represents:

I. That it is a body corporate under the laws of the Republic of France, having its principal office in Paris in said Republic.

II. That on the first day of July, 1884, letters patent of the United States No. 301220 were duly granted to your petitioner, as the assignee of Charles T. M. V. de Bange, of the French army, for an improvement in breech-loading ordnance (a copy of said letters patent being filed herewith and made a part hereof), the assignment to your petitioner from said Colonel de Bange being dated March 22, 1883, and recorded in the United States Patent Office May 7, 1883.

III. That the said De Bange was the true, original, and first inventor of the said improvement, now generally known and hereinafter designated as the "De Bange gas check;" that the same was not known or used prior to his invention thereof, and not in public use or on sale in the United States for more than two years prior to the date of the application for said letters patent; that said letters patent were in all respects duly issued and delivered in conformity with the laws of the United States, and that your petitioner has been since the grant of the same, and is now, the sole owner thereof.

IV. That the said invention is, and is generally recognized to be, of great importance and value in the construction of heavy ordnance, and has been extensively tested, adopted, and used in the construction of such ordnance, being so adopted and used in guns constructed by or for the governments of the United States, Great Britain, France, Sweden, Norway, Denmark, Spain, Servia, Italy, and others, and is thus widely and generally known as the "De Bange gas check," or the "De Bange system," in the governmental reports and in technical and other works giving an account of the same.

2 V. That in 1883 the said Colonel de Bange, being at that time the manager of your petitioner's works, was in the habit of receiving the attaches or representatives of foreign governments who desired or were instructed to acquaint themselves with the construction and working of the class of artillery known as the "De Bange system;" that in said year Lieutenant F. E. Chadwick, then the naval attache of the United States legation at Paris, was in communication with said Colonel de Bange, who, with the desire and for the purpose of having his said invention adopted by the Government of the United States, furnished to said Lieutenant Chadwick

full information regarding the same, giving him one of the elastic pads, together with drawings illustrating the construction and operation of the mechanism; and that, as your petitioner is informed and believes, the information thus communicated to Lieutenant Chadwick was by him officially transmitted through the usual official channels to the Navy Department of the United States.

VI. That in the same year (1883) a commission was appointed by the President of the United States, under the authority of an act of Congress approved March 3, 1883, said commission being composed of six officers selected from the army and navy, namely, Commodore Edward Simpson, United States Navy, president of the board; Captain Edward O. Matthews, United States Navy; Colonel Thomas G. Baylor, Ordnance Department, United States Army; Lieut. Col. Henry L. Abbot, Engineer Corps, United States Army; Major Samuel S. Elder, Artillery, United States Army, and Lieutenant William H. Jaques, United States Navy; that said commission was organized for the purpose, inter alia, of visiting the principal ordnance works of Europe and ascertaining the best system for the manufacture of heavy ordnance; that upon the arrival of said commission in Paris, to wit, on the 29th day of August, 1883, the members thereof visited the works of your petitioner, were received by said Colonel de Bange, and afforded opportunity to examine the breech-loading ordnance of the De Bange system; that said commission in its report to Congress, dated February 16, 1884 (H. Ex. Doc. No. 97, Forty-eighth Congress), referred to its visit to the works of your petitioner (p. 79), and on page 33 of said report say:

"*Breech fermeture.*—All the French guns are breech-loading, and are fitted with the interrupted screw system, as modified by Colonel de Bange, to suit his gas check.

"*Gas check.*—The De Bange gas check is universally employed."

VII. That a further account of the proceedings of said commission was published in the Proceedings of the United Naval Institute for 1884, Vol. X, No. 4, giving at pages 748 to 752, drawings and descriptions of your petitioner's said invention under the title of "Fermeture De Bange," fully explaining the construction, operation, and advantages thereof; that similar accounts and illustrations of the said invention appeared in the Ordnance Notes for 1883 (No. 292) of the U. S. Army, and in other official and technical publications, being always credited to the said Colonel de Bange.

3 VIII. That in consequence of the knowledge thus conveyed to the ordnance officers of the United States of the invention of Colonel de Bange, owned by your petitioner as aforesaid, the said in vention was from time to time tested as to its efficiency, reliability, and advantages as compared with other obturating devices or gas checks, and eventually was adopted as the standard service mechanism for the modern breech-loading ordnance both of the Army and Navy of the United States, to the exclusion of all other devices having the same function or object, all of which appears by the official reports of the Ordnance Departments of the United States

Army and Navy; that the Chief of the Bureau of Ordnance of the Navy in his report of 1885 said:

"Further and very extensive trials have been had with the De Bange gas check. Much of this practice has occurred in connection with the proof of the 6-inch gun for the new steel cruisers.

"The check was found to be more satisfactory than any other thus far brought forward; but occasionally it would stick badly in the chamber without apparent cause."

That further experiments and tests were made in the years 1886, 1887, and 1888, for the purpose of a settlement of the questions regarding the service of the new armament, and in the report for the latter year (1888) illustrations of the service guns were given showing the De Bange gas check, and the statement made that—

"The service breech mechanism continues practically the same as heretofore, and has given entire satisfaction in service;"—

that other official reports for the years 1889, 1890, 1891, 1892, describing the standard types of guns adopted for the service of the United States Army and Navy, refer to the De Bange gas check as an essential part thereof, and such use of the said invention of your petitioner was thus authorized by the proper officers of the Government of the United States, with the permission of your petitioner, who expected and is entitled to receive compensation therefor.

IX. That the principal features or elements of the said invention, patented to your petitioner as aforesaid, may be described as follows:

The gas-check pad or packing, composed of asbestos and tallow, adapted to withstand the action of high heat and pressure developed in discharging the gun, is enclosed between shells or discs of metal and seated against the inner end of the breech-block or plug; the "mushroom" or headed-pin has its stem extending through the breech-block or plug, it being on one side of the pad and the breech-block or plug on the other, these parts being so constructed and combined that when the gun is discharged the pressure of the evolved gases drives the mushroom rearward, pressing its head against the pad, which is thereby caused to expand radially, obturating or sealing the breech against the escape of gases. After the firing the obturating pad and mushroom resume their normal positions, permitting removal of the breech-plug for loading.

4 The description of the said mechanism, as partly given in an official publication of the Bureau of Ordnance, Navy Department, entitled "Description of Modern Ordnance in the United States Navy," 1894, is as follows:

"The De Bange gas check (pls. 7 and 8), used in this and all other guns without metallic cartridge cases, consists of a steel mushroom 21 with head 22 nearly of the diameter of the chamber, and shank 26 passing through a central hole in the breech-plug, and an obturating pad 17 on the shank between the mushroom head and the face of the plug. The obturating pad consists of two steel disks 18 and 19 enclosing a canvas-covered pad 20 of asbestos and mutton tallow. Two nuts 31 and 32 on its inner end hold the mushroom in place, and

a frictionless washer 16 between the forward nut and the plug allows the latter to turn independently of the mushroom when the pad sticks to the chamber walls after firing. * * The nomenclature of the De Bange gas check for all calibres is the same."

That the principal requirements which a breech mechanism should fulfill, the manner in which they are fulfilled by your petitioner's invention, and the advantages thereof are thus described in the official "Text Book of Ordnance and Gunnery, by Lieut.-Commander R. R. Ingersoll, 1894," in use at the United States Naval Academy:

"I. *The breech mechanism.*—The principal requirements which a breech mechanism should fulfill are:

"1. That it should completely stop all escape of gas to the rear. It will be evident that, however good in other respects, any system which fails in this requirement fails in its primary object.

"2. That it should not weaken the gun. In comparison with a muzzle loader of the same weight, it should not be inherently weaker.

"3. That it should not be easily put out of order.

"4. That all parts exposed to wear should be capable of being replaced on the spot.

"5. It should be easy to work. This is essential to rapidity and continuity of fire.

"6. The sealing, or 'obturation,' against the escape of gas should be automatic, and the greater the pressure the more complete and secure the closing, independent of any perfection of fit in the breech mechanism.

"II. *System for B. L. R. heavy guns.*—The interrupted screw system combined with the De Bange gas check has been adopted for use with the B. L. R. guns for the navy, as fulfilling the above conditions so far as there is any possibility of their being fulfilled at all. In this the breech-block has a thread cut on its outer surface, the circumference being divided into six equal parts, and from three of these the threads are cut away longitudinally.

"III. *The De Bange gas check.*—The De Bange gas check (see Plate III) consists of a large mushroom-headed piece of steel A, fitted to the block B, the stalk or stem passing through it. The mushroom head fits the bore tolerably closely, and between it and the face of the block, on the stem, is placed the obturator pad. This consists of two plates of tempered steel S, shaped as shown in section in Plate III, and containing between them a ring of asbestos and grease enclosed in a canvas covering and pressed into shape by hydraulic pressure.

"On firing, the mushroom head is pressed back and forces the asbestos ring out tightly against the surface of the tube E, completely sealing all escape of gas. A frictionless ring or washer R (see also Plate III) is fitted around the stem, with the idea of relieving the friction when the plug is turned for reloading, the pitch of the screw bringing pressure on the friction ring as the plug comes to the rear; evidently the plug turns independently. The mushroom is held in place by the nuts N on the end of the stem.

"IV. The advantages of the De Bange gas check are certainty of action, durability, and ease of adjustment.

"It requires no great accuracy of workmanship or care in fitting, and it may be changed in case of accident with little delay.

"The pad and mushroom project beyond the screw-box in the jacket into the inner tube of the gun, and therefore take up a little more room than some other gas checks, but this is a very slight disadvantage compared with its many advantages."

Your petitioner's invention and its advantages are further described in the official text-book in use at the U. S. Military Academy (Ordnance and Gunnery, by Captain Henry Metcalf, 1891), where the defects and destructibility of other gas-check systems are pointed out, and it is stated that—

"to the last consideration is due the almost universal employment of the De Bange gas check, since this has been found almost indestructible by the accidents of service, and to resume its shape when deformed by firing."

X. That no express agreement was made between the petitioner and the officers of the United States respecting a price to be paid to petitioner as compensation for the use of its said invention, but that when and after the use of said invention was so authorized as aforesaid with knowledge of your petitioner's rights, and with express credit given to the inventor and patentee of said invention, your petitioner expected and was entitled to receive just compensation for the use thereof; that it is not the general practice and usage of the ordnance officers of the United States to decide upon the amounts that should justly be paid to patentees for the use of their inventions, but, upon information and belief, your petitioner alleges the custom and usage of such department to be to keep fully informed of all patented improvements and inventions in firearms, to adopt and use such inventions as are merit, with the intention and understanding that the question of the proper amount of compensation for such use shall be referred to this honorable court; and that in pursuance of such custom and usage the honorable the Secretaries of the War and Navy of the United States have declined to pass upon the claim of your petitioner or to fix the amount of compensation which is justly due for the use of said invention.

XI. That your petitioner is not informed as to the exact number of guns in use or in course of manufacture for use in the service of the United States Government, and in which the invention of your petitioner is employed, but upon information and belief alleges that said invention is so used in and upon, or has been used within six years past in and upon, seven hundred guns and mortars of various calibre, costing from $6,000 to $50,000 each; that an ordinary equipment for each gun comprises the various metallic parts and three pads, one for service and two for emergency; that a fair and
6 just compensation to your petitioner for the use of said invention would be two hundred dollars per gun, and that by reason of the premises the United States, defendants herein, are justly indebted to the petitioner in the sum of two hundred dollars for each

and every gun in the service of the United States employing or containing the said invention, amounting to one hundred and forty thousand dollars, which sum is still due to the petitioner from the United States, no part thereof having been paid.

XII. That the petitioner is the sole owner of the claim set forth in this petition, no assignment or transfer of the said claim, or of any interest therein, having ever been made; and that petitioner is justly entitled to the amount herein claimed from the United States, after allowing all just credits and offsets.

XIII. That no action upon your petitioner's claim has been had by or before Congress, or any executive department of the Government, except that petitioner, through its counsel, brought the subject of its claim to compensation for the use of said invention by the United States to the attention of the Secretaries of War and Navy, in communications dated January 31, 1894, whereupon an investigation and consideration of the matter was had in both said departments of the Government; that, as the result of such investigation, the honorable the Secretary of the Navy, under date of December 31, 1894, addressed a communication to petitioner's counsel referring to the questions involved in such claim, and stating:

"Under the circumstances the department is of opinion that the full consideration and determination of the questions can be more certainly and equitably reached, and the rights of all the parties concerned, as well as the Government, more definitely ascertained and assured through the medium of a court of justice. It is, therefore, suggested that the necessary proceedings for the consideration and adjustment of the matter by the Court of Claims be instituted."

And under date of January 14, 1895, the honorable the Secretary of War addressed to petitioner's counsel a letter of like tenor and effect containing the identical language above quoted.

XIV. That the petitioner is as aforesaid a corporation under the laws of France, and the said Colonel de Bange a citizen of France, and that as such they maintained a strict neutrality during the late rebellion against the Government of the United States, and have not in any way voluntarily aided, abetted, or given encouragement to rebellion against the Government.

XV. That under the constitution and laws of France, citizens of the United States of America have a remedy against the Government of France in like cases, similar to that your petitioner now seeks to avail himself of in this court.

XVI. That the facts stated in this petition are true.

Whereupon your petitioner asks judgment in its favor against the United States for the said sum of one hundred and forty thousand ($140,000) dollars.

7 The petitioner's address is Paris, France; the address of its attorneys, Pollok & Mauro, is No. 620 F street, Washington, D. C.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL,
By POLLOK & MAURO,
Its Attorneys.

DISTRICT OF COLUMBIA, *City of Washington, ss:*

Anthony Pollok, being first duly sworn according to law, says: That he is a member of the firm of Pollok & Mauro, the attorneys for the Société Anonyme des Anciens Etablissements Cail, the petitioner named in the foregoing petition; that he has read the said petition and knows the contents thereof, and that the facts stated in the said petition are true to the best of his knewledge, information, and belief.

ANTHONY POLLOCK.

Subscribed and sworn to before me this 24th day of January, 1895.

[SEAL.]

DAVID E. MOORE,
Notary Public.

POLLOK & MAURO,
Attorneys of Record,
620 F street, Washington, D. C.

8 *Traverse. Filed October 22, 1907.*

In the Court of Claims of the United States, Term A. D. 1906–1907.

SOCIÉTÉ ANONYME DES ANCIENS Etablissements Cail *vs.* THE UNITED STATES. } No. 18796.

And now comes the Attorney-General, on behalf of the United States, and, answering the petition of the claimant herein, denies each and every allegation therein contained, and asks judgment that the petition be dismissed.

JOHN Q. THOMPSON,
Assistant Attorney-General.

Filed October 22, 1907.

J. R.

III. *Argument and submission of case.*

At a Court of Claims held October 22d and 23d, 1907, this cause was argued by Mr. Philip Mauro for the claimant and by Mr. Malcom A. Coles for the defendants, and submitted.

9 *IV. Amended petition.*

Subsequently, to wit, on April 12, 1909, by leave of court the claimant filed its amended petition in lieu of said original petition, which is as follows:

Amended petition. Filed April 12, 1909.

To the honorable the Judges of the Court of Claims:

The petition of the Société Anonyme des Anciens Etablissements Cail respectfully represents:

I. That it is a body corporate under the laws of the Republic of France, having its principal office in Paris, in said Republic.

II. That on the first day of July, 1884, letters patent of the United States No. 301,220 were duly granted to your petitioner, as the assignee of Charles T. M. V. de Bange, of the French army, for an improvement in breech-loading ordnance (a copy of said letters patent being filed herewith and made a part hereof), the assignment to your petitioner from said Colonel de Bange being
10 dated March 22, 1883, and recorded in the United States Patent Office May 7, 1883.

III. That the said De Bange was the true, original, and first inventor of the said improvement, now generally known and hereinafter designated as the "De Bange gas check;" that the same was not known or used prior to his invention thereof, and not in public use or on sale in the United States for more than two years prior to the date of the application for said letters patent; that said letters patent were in all respects duly issued and delivered in conformity with the laws of the United States, and that your petitioner has been since the grant of the same, and is now, the sole owner thereof.

IV. That the said invention is, and is generally recognized to be, of great importance and value in the construction of heavy ordnance, and has been extensively tested, adopted, and used in the construction of such ordnance, being so adopted and used in guns constructed by or for the Governments of the United States, Great Britain, France, Sweden, Norway, Denmark, Spain, Servia, Italy, and others, and is thus widely and generally known as the "De Bange gas check," or the "De Bange system," in the governmental reports and in technical and other works giving an account of the same.

V. That in 1883 the said Colonel de Bange, being at that time the manager of your petitioner's works, was in the habit of receiving the attaches or representatives of foreign governments who desired or were instructed to acquaint themselves with the construction and working of the class of artillery known as the "De Bange system;" that in said year Lieutenant F. E. Chadwick, then the naval attache of the United States legation at Paris, was in communication with said Colonel de Bange, who, with the desire and for the purpose of having his said invention adopted by the Government of the United States, furnished to said Lieutenant Chadwick full information re-

garding the same, giving him one of the elastic pads, together with drawings illustrating the construction and operation of the mechanism; and that, as your petitioner is informed and believes, the information thus communicated to Lieutenant Chadwick was by him officially transmitted through the usual official channels to the Navy Department of the United States.

VI. That in the same year (1883) a commission was appointed by the President of the United States, under the authority of an act of Congress approved March 3, 1883, said commission being composed of six officers selected from the army and navy, namely, Commodore Edward Simpson, United States Navy, president of the board; Captain Edward O. Matthews, United States Navy; Colonel Thomas G Baylor, Ordnance Department, United States Army; Lieut.-Col. Henry L. Abbot, Engineer Corps, United States Army; Major Samuel S. Elder, Artillery, United States Army, and
11 Lieutenant William H. Jaques, United States Navy; that said commission was organized for the purpose, inter alia, of visiting the principal ordnance works of Europe and ascertaining the best system for the manufacture of heavy ordnance; that upon the arrival of said commission in Paris, to wit, on the 29th day of August, 1883, the members thereof visited the works of your petitioner, were received by said Colonel de Bange and afforded opportunity to examine the breech-loading ordnance of the De Bange system; that said commission, in its report to Congress dated February 16, 1884 (H. Ex. Doc. No. 97, Forty-eighth Congress), referred to its visit to the works of your petitioner (p. 79), and on page 33 of said report say:

"*Breech fermeture.*—All the French guns are breech-loading, and are fitted with the interrupted screw system, as modified by Colonel de Bange, to suit his gas check.

"*Gas check.*—The De Bange gas check is universally employed."

VII. That a further account of the proceedings of said commission was published in the Proceedings of the United Naval Institute for 1884, Vol. X, No. 4, giving at pages 748 to 752 drawings and descriptions of your petitioner's said invention under the title of "Fermeture de Bange," fully explaining the construction, operation, and advantages thereof; that similar accounts and illustrations of the said invention appeared in the Ordnance Notes for 1883 (No. 292) of the U. S. Army, and in other official and technical publications, being always credited to the said Colonel de Bange.

VIII. That in consequence of the knowledge thus conveyed to the ordnance officers of the United States of the invention of Colonel de Bange, owned by your petitioner as aforesaid, the said invention was from time to time tested as to its efficiency, reliability, and advantages as compared with other obturating devices or gas checks, and eventually was adopted as the standard service mechanism for the modern breech-loading ordnance both of the Army and Navy of the United States, to the exclusion of all other devices having the same function or object, all of which appears by the official reports of the Ordnance

Departments of the United States Army and Navy; that the Chief of the Bureau of Ordnance of the Navy in his report of 1885 said:

"Further and very extensive trials have been had with the De Bange gas check. Much of this practice has occurred in connection with the proof of the 6-inch gun for the new steel cruisers.

"The check was found to be more satisfactory than any other thus far brought forward, but occasionally it would stick badly in the chamber without apparent cause."

That further experiments and tests were made in the years 1886, 1887, and 1888 for the purpose of a settlement of the questions regarding the service of the new armament, and in the report for the latter year (1888) illustrations of the service guns were given showing the De Bange gas check, and the statement made that—

12 "The service breech mechanism continues practically the same as heretofore, and has given entire satisfaction in service;"

that other official reports for the years 1889, 1890, 1891, 1892, describing the standard types of guns adopted for the service of the United States Army and Navy, refer to the De Bange gas check as an essential part thereof, and such use of the said invention of your petitioner was thus authorized by the proper officers of the Government of the United States, with the permission of your petitioner, who expected and is entitled to receive compensation therefor.

IX. That the principal features or elements of the said invention, patented to your petitioner as aforesaid, may be described as follows:

The gas-check pad or packing, composed of asbestos and tallow, adapted to withstand the action of high heat and pressure developed in discharging the gun, is inclosed between shells or discs of metal and seated against the inner end of the breech-block or plug; the "mushroom" or headed pin has its stem extending through the breech-block or plug, it being on one side of the pad and the breech-block or plug on the other, these parts being so constructed and combined that when the gun is discharged the pressure of the evolved gases drives the mushroom rearward, pressing its head against the pad, which is thereby caused to expand radially, obturating or sealing the breech against the escape of gases. After the firing the obturating pad and mushroom resume their normal positions, permitting removal of the breech-plug for loading.

The description of the said mechanism, as partly given in an official publication of the Bureau of Ordnance, Navy Department, entitled "Description of Modern Ordnance in the United States Navy," 1894, is as follows:

"The De Bange gas check (pls. 7 and 8), used in this and all other guns without metallic cartridge cases, consists of a steel mushroom 21 with head 22 nearly of the diameter of the chamber, and shank 26 passing through a central hole in the breech-plug, and an obturating pad 17 on the shank between the mushroom head and the face of the plug. The obturating pad consists of two steel disks 18 and 19 enclosing a canvas-covered pad 20 of asbestos and mutton tallow. Two nuts 31 and 32 on its inner end hold the mushroom in place,

and a frictionless washer 16 between the forward nut and the plug allows the latter to turn independently of the mushroom when the pad sticks to the chamber walls after firing. * * * The nomenclature of the De Bange gas check for all calibres is the same."

That the principal requirements which a breech mechanism should fulfill, the manner in which they are fulfilled by your petitioner's invention, and the advantages thereof are thus described in the official "Text Book of Ordnance and Gunnery, by Lieut.-Commander R. R. Ingersoll, 1894," in use at the United States Naval Academy:

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"1. That it should completely stop all escape of gas to the rear. It will be evident that, however good in other respects, any system which fails in this requirement fails in its primary object.

"2. That it should not weaken the gun. In comparison with a muzzle loader of the same weight, it should not be inherently weaker.

"3. That it should not be easily put out of order.

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"6. The sealing, or 'obturation,' against the escape of gas should be automatic, and the greater the pressure the more complete and secure the closing, independent of any perfection of fit in the breech mechanism.

"II. *System for B. L. R. heavy guns.*—The interrupted screw system combined with the De Bange gas check has been adopted for use with the B. L. R. guns for the navy, as fulfilling the above conditions so far as there is any possibility of their being fulfilled at all. In this the breech-block has a thread cut on its outer surface, the circumference being divided into six equal parts, and from three of these the threads are cut away longitudinally.

"III. *The De Bange gas check.*—The De Bange gas check (see Plate III) consists of a large mushroom-headed piece of steel A, fitted to the block B, the stalk or stem passing through it. The mushroom head fits the bore tolerably closely, and between it and the face of the block, on the stem, is placed the obturator pad. This consists of two plates of tempered steel S, shaped as shown in section in Plate III, and containing between them a ring of asbestos and grease enclosed in a canvas covering and pressed into shape by hydraulic pressure.

"On firing, the mushroom head is pressed back and forces the asbestos ring out tightly against the surface of the tube E, completely sealing all escape of gas. A frictionless ring or washer R (see also Plate III) is fitted around the stem with the idea of relieving the friction when the plug is turned for reloading, the pitch of the screw bringing pressure on the friction ring as the plug comes to the rear; evidently the plug turns independently. The mushroom is held in place by the nuts N on the end of the stem.

"IV. The advantages of the De Bange gas check are certainty of action, durability, and ease of adjustment.

"It requires no great accuracy of workmanship or care in fitting, and it may be changed in case of accident with little delay.

"The pad and mushroom project beyond the screw-box in the jacket into the inner tube of the gun, and therefore take up a little more room than some other gas checks, but this is a very slight disadvantage compared with its many advantages."

Your petitioner's invention and its advantages are further described in the official text-book in use at the U. S. Military Academy (Ordnance and Gunnery, by Captain Henry Metcalf, 1891), where the defects and destructibility of other gas-check systems are pointed out, and it is stated that—

"to the last consideration is due the almost universal employment of the De Bange gas check, since this has been found almost indestructible by the accidents of service, and to resume its shape when deformed by firing."

14 X. That no express agreement was made between the petitioner and the officers of the United States respecting a price to be paid to petitioner as compensation for the use of its said invention, but that when and after the use of said invention was so authorized as aforesaid with knowledge of your petitioner's rights, and with express credit given to the inventor and patentee of said invention, your petitioner expected and was entitled to receive just compensation for the use thereof; that it is not the general practice and usage of the ordnance officers of the United States to decide upon the amounts that should justly be paid to patentees for the use of their inventions, but, upon information and belief, your petitioner alleges the custom and usage of such department to be to keep fully informed of all patented improvements and inventions in firearms, to adopt and use such inventions as have merit, with the intention and understanding that the question of the proper amount of compensation for such use shall be referred to this honorable court; and that in pursuance of such custom and usage the honorable the Secretaries of the War and Navy of the United States have declined to pass upon the claim of your petitioner or to fix the amount of compensation which is justly due for the use of said invention.

XI. That your petitioner is informed and believes that the invention of your petitioner was used in and upon fifteen hundred and eighteen guns of various calibres within the six years next preceding the filing of the original petition herein, to wit:

	BY THE ARMY.	Each.	
362	3"2 rifles; at	$1,022	$369,964.00
25	3"6 rifles; at	1,169	29,225.00
44	5" siege rifles; at	2,306	101,464.00
61	7" siege mortars; at	1,351	82,411.00
41	7" siege howitzers; at	2,733	112,053.00
94	8" rifles; at	12,327	1,158,738.00
127	10" rifles; at	23,458	2,979,166.00
115	12" rifles; at	36,306	4,175,190.00
354	12" mortars; at	9,938	3,518,052.00
			$12,526,263.00

BY THE NAVY.

		Each.	
4	4″ B. L. R.; at	$3,000	$12,000.00
2	5″ B. L. R.; at	4,500	9,000.00
133	6″ B. L. R.; at	6,000	798,000.00
81	8″ B. L. R.; at	15,500	1,255,500.00
25	10″ B. L. R.; at	27,500	687,500.00
16	12″ B. L. R.; at	45,500	728,000.00
34	13″ B. L. R.; at	65,000	2,210,000.00
			$5,700,000.00

15 that the total cost of all of said guns aforesaid is $18,226,263.00; that a fair and just compensation to your petitioner for the use of said invention in said guns is $1,447,667.98, said sum being six per centum of the cost of guns of less than 6″ caliber and eight per centum of the cost of guns of 6″ caliber and over; and that by reason of the premises the United States of America, defendants herein, are justly indebted to your petitioner in the sum of $1,447,667.98, which sum is still due to your petitioner from the United States of America, no part thereof having been paid.

XII. That the petitioner is the sole owner of the claim set forth in this petition, no assignment or transfer of the said claim, or of any interest therein, having ever been made; and that petitioner is justly entitled to the amount herein claimed from the United States, after allowing all just credits and offsets.

XIII. That no action upon your petitioner's claim has been had by or before Congress, or any executive department of the Government, except that petitioner, through its counsel, brought the subject of its claim to compensation for the use of said invention by the United States to the attention of the Secretaries of War and Navy, in communications dated January 31, 1894, whereupon an investigation and consideration of the matter was had in both said departments of the Government; that, as the result of such investigation, the honorable the Secretary of the Navy, under date of December 31, 1894, addressed a communication to petitioner's counsel referring to the questions involved in such claim, and stating:

"Under the circumstances the department is of opinion that the full consideration and determination of the questions can be more certainly and equitably reached, and the rights of all the parties concerned, as well as the Government, more definitely ascertained and assured through the medium of a court of justice. It is, therefore, suggested that the necessary proceedings for the consideration and adjustment of the matter by the Court of Claims be instituted."

And that under date of January 14, 1895, the honorable the Secretary of War addressed to petitioner's counsel a letter of like tenor and effect containing the identical language above quoted.

XIV. That the petitioner is as aforesaid a corporation under the laws of France, and the said Colonel de Bange a citizen of France, and that as such they maintained a strict neutrality during the late rebellion against the Government of the United States, and have not in any way voluntarily aided, abetted, or given encouragement to rebellion against the Government.

XV. That under the constitution and laws of France, citizens of the United States of America have a remedy against the Government of France in like cases, similar to that your petitioner now seeks to avail himself of in this court.

16 XVI. That the facts stated in this petition are true.

Whereupon your petitioner asks judgment in its favor against the United States for the said sum of one million four hundred forty-seven thousand six hundred sixty-seven dollars and ninety-eight cents ($1,447,667.98).

The petitioner's address is Paris, France; the address of its attorney, Philip Mauro, is No. 620 F street, Washington, D. C.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL,
By PHILIP MAURO,
Its Attorney.

DISTRICT OF COLUMBIA,
City of Washington, ss:

Philip Mauro, being first duly sworn according to law, says: That he is the attorney for the Société Anonyme des Anciens Établissements Cail, the petitioner named in the foregoing amended petition; that he has read the said amended petition and knows the contents thereof, and that the facts stated in the said amended petition are true to the best of his knowledge, information, and belief.

Subscribed and sworn to before me this 12th day of November, 1908.

[SEAL.] RALPH L. SCOTT,
Notary Public, New York County.

17 *V. Findings of fact as amended filed October 25, 1909, as of May 20, 1909, and conclusion of law.*

This case having been heard by the Court of Claims, the court, upon the evidence, makes the following findings of fact:

I.

On June 12, 1883, Charles T. M. Valerand de Bange, a Frenchman, filed in the United States Patent Office an application for a patent for breech-loading ordnance, together with an assignment of same to claimants herein, dated March 23, 1883. The specification was the same as in the patent when ultimately granted, but the claims read as follows:

"First. The screw-plug B, pin N, head N′, and yielding packing M, in combination with each other, and with the gun A, arranged to serve as herein specified.

"Second. The locking ring G^3, pin N, head N′, and packing M, in combination with the screw-plug B, and gun A, as herein specified.

"Third. The construction of the packing M with a fibrous interior M′, and the shell M^2 and M^3, in combination with the pin N, head N′, screw-plug B, and gun A, as herein specified.

"Fourth. The door G, turning in the axis F, in combination with the gun A and screw-plug B, and arranged to support the latter, and allow it to be moved backward and forward through the door, as herein specified.

"Fifth. The turning-catch H, in combination with the door G, gun A and screw-threaded plug B, arranged to engage its arms alternately with the gun, and with the screw-plug in the several positions, as herein specified.

"Sixth. The lever D, having a projection or cam D′, in combination with the door G, having a groove *g*, and with the screw-plug B and gun A, as herein specified.

18 The examiner rejected all the claims for the following reasons:

"Claims 1, 2, 3, 5, and 6 are vague. The arrangement of the parts should be defined in the claims, not left to be discovered from the specification. Claims 1 and 2 are met by the patent of Quick, No. 258,116, May 16, 1882, ordnance breechloaders, ordnance.

"Claim 4 is met by the patent of Palliser, No. 221,419, November 11, 1879, breechloaders, ordnance."

Thereupon De Bange's attorney amended all the claims, the amended claims 1 and 3 reading thus:

"1. The screw-plug B, pin N, head N′, and yielding packing M, in combination with each other, and with the gun A, arranged to allow the head to be driven rearward and compress the packing as herein specified.

"3. The packing M having a tough, yielding interior M′ in combination with the elastic shells M^2 and the rigid shells M^3, adapted to serve with the pin N, head N′, screw-plug B, and gun A, as herein specified."

The examiner rejected the first four of the amended claims for these reasons:

"The first two claims do not distinguish the construction of applicant's breech-closing mechanism. The relative location and operation of the parts must be set forth. Claim 3 is for a species of packing—a distinct invention—which must be covered in a separate application. The fact that applicant in his claim describes the packing as adapted to "serve" with other elements does not free the claim from the objection raised. Claim 4 is met by the patent of Vavasseur, No. 275,550, April 10, 1883, ordnance, breech-loading."

Thereupon De Bange's attorney canceled claim 4, and amended claims 1, 2, and 3 so as to make them read thus:

"1. The partially threaded plug B, headed pin NN′, extending through said plug, and the yielding packing M, arranged between the head N′ and the inner end of the plug, in combination with each other and with the gun A, arranged as shown to allow the pin to be driven rearward and compress the packing, as herein specified.

"2. The locking ring G, turning like a door on the hinge F, screw-plug B, and headed pin NN′, extending through said plug, in combination with the packing M, arranged between the head N′ and the

inner end of the plug and the gun A, as herein specified, for the purpose set forth.

"3. The packing M, having a tough yielding interior M′, the elastic shells M^2, and the rigid shells M^3, in combination with the pin N, head N′, screw-plug B and gun A, as herein specified."

The examiner objected that—

"Claim 3 does not identify the construction. The relation of the packing to the pin and plug, and of such parts to the gun, should be set forth in the claim."

Thereupon De Bange's attorney amended claim 3 so as to make it read thus:

"The packing M having a tough yielding interior M′, elastic shells M^2 and rigid shells M^3, arranged between the inner end of the screw-plug B and inner surface of the head N′ of the pin N, in combination with such parts B, N, and N^1, and the whole arranged and serving relatively to the gun A, as and for the purposes set forth."

After this last amendment the patent was granted, reading as follows:

"UNITED STATES PATENT OFFICE.

"CHARLES T. M. VALÉRAND DE BANGE, OF PARIS, FRANCE, ASSIGNOR TO SOCIÉTÉ ANONYME DES ANCIENS ÉTABLISSEMENTS CAIL, OF SAME PLACE.

"BREECH-LOADING ORDNANCE.

"Specifications forming part of letters patent No. 301,220, dated July 1, 1884.

"[Application filed June 12, 1883. (No model.)]

"*To all whom it may concern:*

"Be it known that I, CHARLES TIMOTHÉE MAXIMILIEN VALÉRAND DE BANGE, of Paris, in the Republic of France, have invented certain new and useful improvements in breech-loading guns, of which the following is a specification.

19 "The improvements apply to breech-loading cannons which employ a screw-plug having its threads interrupted.

"I have devised a system of packing placed in advance of the plug, and which is expanded by the force of the explosion of the powder to make a tight joint to prevent the leakage of gas. I also employ a lever which performs two important functions—one to aid in turning the plug, and another as a safety-guard to insure that the breech is reliably closed before the piece is discharged. My system requires no special tools or apparatus for the opening and closing.

"The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

"Figure 1 is a central longitudinal section. The strong lines show the parts ready for firing. The dotted lines show the transverse lever in a position for conveniently operating to turn the screw-plug. Fig. 2 is a rear view showing the parts locked. Fig. 3 is a corresponding view showing the parts unlocked. The dotted lines show the breech

mechanism swung around so as to leave the breech entirely open. Fig. 4 is a longitudinal section showing the screw-plug partially moved toward the rear. Fig. 5 is a corresponding section partly in elevation, showing the screw-plug moved far to the rear, ready to be carried around by turning on the hinges of the inclosing-collar. Figs. 6 and 7 represent the packing-ring detached. Fig. 6 is a face view, and Fig. 7 a section in the plane of the axis. Fig. 8 shows what I term the "turning-catch" on a larger scale.

"Similar letters indicate like parts in all the figures.

"A is the rear portion of the body or barrel of the gun. B is a screw-plug having its threads interrupted.

"C is a door in the form of a ring or collar, larger than the bore, strongly hinged to the body A on one side, and adapted to swing open when required. When closed, it sinks into a depression surrounding the bore at the breech.

"The interior of the breech of the gun is equipped with series of partial screw-threads alternating with longitudinal spaces, in which the screw-threads are cut away, and allow corresponding segments of screw-thread on the plug to be moved inward and outward easily when the plug is turned in the right position. By thrusting the screw-plug in as far as may be by a direct thrust, and then giving it a partial revolution, the screw-plug is strongly engaged with the breech of the gun. A reverse motion liberates it. D is a lever extending across in rear of the screw-plug B, and hinged thereto by the pivot Q in the short arm B′.

"I employ a locking-catch turning on a center, and subject to the force of a spring, T, which tends to turn it always in one direction. It performs important functions. It is marked H, certain portions being designated, when necessary, by additional marks, as H′ H². It turns on a center, *h*, fixed in the door or hinged ring G.

"A liberal hole in the line of the axis of the screw-plug B carries a stout sliding pin, N, at the extreme front of which is a stout head, N′. The portion of the body adjacent to the head N′ is slightly enlarged. The head N′ is adapted to receive the force of the powder at the discharge. At the moment of the discharge this head moves backward, compressing a relatively soft and expansible packing-ring, M, behind it. Certain portions of this ring will be distinguished, when necessary, by additional marks, as M′ M². The body M′ of this packing is of asbestus saturated with tallow, and affords a sufficiently yielding mass with the required capacity for enduring heat and for withstanding the very strong compressive force to which it is subjected by the discharge. It is inclosed between two thin shells, M² M², of copper, one fitting the body M′ on the inner and the other on the outer side, and nearly incasing the entire packing Both the body M′ and the copper M² are then inclosed between two strong shells of brass, M³ M³. The entire packing thus made is adapted to maintain its form, but to allow a small amount of radial expansion sufficient to pack the joint tightly against the escape of gas. This expansion is due to two causes—the tapering form of the

front end of the pin N, which acts on the interior of the packing, and the powerful compression received from the head N′. The expansion from one or both causes is sufficient to press the exterior of the copper M^2 tightly against the interior of the gun, thus effectually preventing any leakage of gas.

20 "Let us observe the succession of the several movements. To open the breech after firing I proceed as follows: I elevate the cam-lever D into the position shown in dotted lines in Fig. 1. This brings the head or cam D′ out of the mortise *g;* and I then turn the screw-plug B from right to left about one-sixth ($\frac{1}{6}$) of a revolution, the movement being limited by the stop *e*. (See Figs. 2 and 3.) During this movement the wedge form of the groove *b* acts on the arm H′, forcing it out of the groove. This causes a partial revolution of the turning catch H on its axis *h*, and engages the arm H^2 in the mortise *a* of the breech. The screw-plug B is now of the spring T, turns a little on its pin *h* and engages the arm H′ in the breech compels the door G to remain immovable. So soon as the screw-plug B is drawn out sufficiently, the mortise *b* in the screw-plug is presented to the arm H′, and the catch H, under the influence of the spring T, turns a little on its pin *h* and engages the arm H′ in said mortise. This locks the screw-plug B and the door G firmly together, and by the disengagement of the arm H^2 from the mortise *a* in the breech allows the door G, carrying the screw-plug B, to be turned on the axis F, leaving the breech entirely open. This position is represented in dotted lines in Fig. 4. If there be any considerable adhesion of the packing M to the interior of the gun, it may be difficult to draw the screw-plug endwise. In such case, before drawing out the screw-plug, I pull down the lever D into the position shown in strong lines in Fig. 4. This causes the head D′ to strike on a high part of the door G, and acts camwise with great force to induce a small endwise movement of the head N′ and packing M sufficient to overcome the adhesion. Then the plug may be easily drawn out by a direct pull, as before described. To close the breech again after a fresh cartridge is introduced, I operate in the reverse manner. I turn the door G on its axis F, carrying therewith the screw-plug B until the door is closed against the breech of the gun. This closing movement causes the arm H^3 of the turning-catch H to strike the inclined side *u* of the recess U, formed in one side of the breech, and to thereby turn the catch H against the force of the spring T. This turning of the catch H takes the arm H′ out of the mortise *b′* in the screw-plug B, and leaves the latter free to be pushed forward. I then push the screw-plug forward into the gun. Next I turn the screw-plug from left to right a sixth of a revolution, the movement being limited by a stop, *e′*, which is a shoulder or offset formed on the door. Now the lever D drops by its gravity, assisted, if necessary, by the force of the hand, and its cam D′ enters the mortise *g* in the door. This makes sure that the closing is complete, for if the screw-plug has not been turned sufficiently the head D′ of the lever D will not enter the mortise.

"Modifications may be made in the forms and proportions. Parts of the invention may be used without the whole.

"I claim as my invention—

"1. The partially-threaded plug B, headed pin N N′, extending through said plug, and the yielding packing M, arranged between the head N′ and the inner end of the plug, in combination with each other and with the gun A, arranged as shown, to allow the pin to be driven rearward and compress the packing, as herein specified.

"2. The locking-ring G, turning like a door on the hinge F, screw-plug B, and headed pin N N′, extending through said plug, in combination with the packing M, arranged between the head N′ and the inner end of the plug and the gun A, as herein specified, for the purpose set forth.

"3. The packing M, having a tough yielding interior, M′, elastic shells M^2, and rigid shells M^3, arranged between the inner end of the screw-plug B and inner surface of the head N′ of the pin N, in combination with such parts B, N, and N′, and the whole arranged and serving relatively to the gun A as and for the purposes set forth.

"4. The turning-catch H, in combination with the hinged locking ring or door G, gun A, and partially screw-threaded plug B, arranged to engage its arms alternately with the gun and with the screw-plug in the several positions, as herein specified.

"5. The lever D, having a projection or cam, D′, in combination with the locking ring or door G, having a groove *g*, and with the partial-threaded screw-plug B and gun A, as herein specified.

"In testimony whereof I have hereunto set my hand, at Paris, France, this 28th day of May, 1883, in the presence of two subscribing witnesses.

CHARLES TIMOTHÉE MAXIMILIEN VALÉRAND DE BANGE.

"Witnesses:

"EDWARD P. MACLEAN,

"EUG. DUBAIL."

22 II.

The state of the art at the time this patent No. 301,220 was applied for is shown by a number of prior patents and publications: United States patent No. 6,612, of 1849, to Chambers; United States patent No. 9,943, of 1853, to Schenkl; United States patent No. 13,507, of 1855, to Joslyn; United States patent No. 14,949, of 1856, to Clement; British patent No. 907, of 1861, to Bailey; British patent No. 3,478, of 1862, to Richards; British patent No. 1,415, of 1856, to Lindner; British patent No. 3,275, of 1863, to Lindner; British patent No. 3,308, of 1863, to Byrnes and Benjamin; United States patent No. 60,832, of January 1, 1867, to Chassepot; French patent No. 91,107, of December 1, 1870, to Mauduit; United States patent No. 159,170, of January 26, 1875, to Felt; United States patent No. 258,116, of May 16, 1882, to Quick.

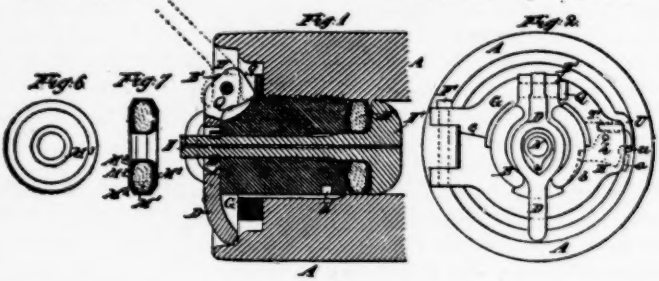
Another invention was the Williams gun, used in the Confederate army.

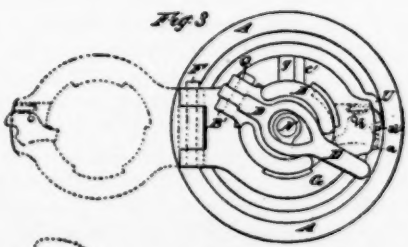
(No Model.)

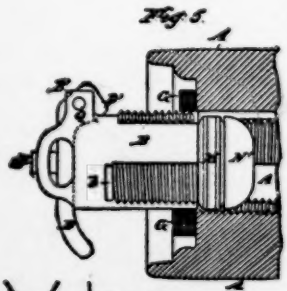
C. T. M. V. DE BANGE.

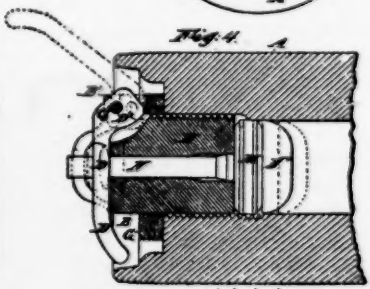
BREECH LOADING ORDNANCE.

No. 301,220. Patented July 1, 1884.









WITNESSES—

Charles R. Searle,

R. E. Goepel.

INVENTOR—

C. T. M. V. de Bange

by his attorney

Thos. D. Stetson.

The Elswick cup gas check and the Broadwell ring gas check had each been in successful use in connection with the slotted screw breech plug for some years before De Bange's gas check was made.

The history of the development of gas checks using a yielding packing is contained in an article in volume 12 of the Revue d'Artillerie, an official publication of the French Government, pages 393–398, 402–415, and volume 13, pages 18–24.

[Translation of article in Revue d'Artillerie, Vol. XII, August 18, 1878, beginning at p. 393. The portions omitted have nothing to do with obturation.]

History of the Experiments Carried on at Calais Upon Rifled Field Guns.

INTRODUCTION.

[Continued from Vol. XII, July, 1878.]

Breechloading.

A complete study of breechloading, from its origin down to 1870, however condensed it might be, could not find place in this introduction.[41] There will therefore be considered here only the works carried on some years before the war, either at the central depot or at the workshop of Meudon.

CENTRAL DEPOT.

The first trials of breechloading, made in the workshops of the central depot, began in the years 1858 and 1859. They were undertaken, at the Emperor's request, by Col. Treuville de Beaulieu, then director of the workshop of precision, who had already occupied himself for some time with this question. Joined with the experiments upon long-range guns, they seemed then, according to received ideas, to be of interest to naval artillery only.[42]

394.

Nevertheless, about the same period some foreign breechloading guns had been the subject of experiments on the part of the land artillery, and sometimes even of tests, the results of which were submitted to the examination of the committee.

Thus they were occupied about 1847 with the Cavalli rifled cannon, already offered to the navy by its inventor, an officer of the Sardinian artillery.

In 1855 a cast-iron 24-pounder cannon had been experimented with at Vincennes with the Wahrendorff system of fermeture, firing a

[41] See the Rapport de Calais (second issue), second part: Breech fermetures and obturators.

[42] See Memorial de l'Artillerie de Marine. History of the experiments undertaken by the department of the navy in the investigation of the breechloading system. (Vol. IV, p. 507, and Vol. V, p. 507.)

spherical ball. The propositions made to the French Government by M. Wahrendorff, a Swedish ironmaster, began in the year 1842, and one of his guns had been tested at Gavre by the navy that same year.

23 In 1855 M. Engstrom, lieutenant in the Swedish navy, brought forward a new smooth-bore breechloading gun, which, first tested at Vincennes in 1857 and 1858, was at first judged unfavorably.

Experiments were, however, resumed in 1861, and in view of the new results obtained, at least as to whatever related to breechloading and the method of obturation, the committee, in 1862, announced the opinion that it was desirable to compare this method with that of Colonel Treuville de Beaulieu, which at the end of long tests had given results so satisfactory that the navy had decided in the same year to put it in service for some of its high-power guns.

This opinion of the committee was not followed at that time and the Engstrom system was laid aside. In the experiments subsequently continued at the workshop of precision, under the direction of Colonel Treuville, for the application of breechloading to bronze guns of land artillery, only two methods of fermeture received attention—the system of screw with interrupted threads, or system Treuville de Beaulieu,[a] and the system of piston and bolt of Wahrendorff, which, laid aside at first in consequence of unsuccessful tests, had again been subjected to investigation.

It was only in 1867, after several years of experiments, that the tests of bronze breechloading guns began.

8-pounder breechloading guns.—At the same time that the question of converting the old smooth-bore guns of the caliber of 8 into rifled guns of the regulation model was reached, the minister authorized the central depot to convert two of these same 8-pounder cannon into breechloading guns.

In thus applying the breechloading system to old guns it was proposed to study with the least expense possible the best system of fermeture and the most advantageous means of obturation; then, at the same time, to study this new system of guns in regard to mechanism, rifling, and projectiles.

These two first cannon having given sufficiently good results in the preliminary trials carried on at the commencement of the year 1868 by the School of Versailles, the committee asked authority from the minister to have six other 8-pounder cannon converted into breechloading. As soon as finished, the new guns were sent to the camp of Chalons, to be there subjected to a complete series of tests so that all the indispensable elements would be brought together to throw light on the question of breechloading and to insure by prolonged fire that the guns really fulfilled the conditions of security which should be required of fieldpieces.

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[a] The use of the screw with interrupted threads for the breech fermetures of guns had been proposed in 1842 by Capt. Treuville de Beaulieu, in a memorial addressed that same year to the minister of war.

Rifling.—The 8-pounder smoothbore guns converted to breechloading had been rifled according to the Prussian system[a] model of 1864; the grooves, to the number of 16, were of tapering width, and of uniform depth.

Diameter of the bore on the lands	180 mm, 6
Diameter of the bore at the bottom of the grooves	111 mm, 2
Pitch of the driving edge of the groove	5 mm, 0

Mechanism of the fermeture.—One-half of the pieces had received the fermeture mechanism of the Wahrendorff system, such as the Belgians had applied to their breechloading guns; the other half, the fermeture mechanism of the system Treuille de Beaulieu.

The two mechanisms functioned equally well. The commission of Chalons, without pronouncing itself in a definite way, nevertheless gave its preference to the Treuille mechanism, which, although more delicate than the Wahrendorff, had the advantage of being more rapidly and easily worked, and requiring only one man, while the other needed the combined action of two gunners, one to work the piston and the other to work the screw.

Obturation.—In the two first guns, destined for the preliminary trials, the mode of obturation was different. With the fermeture mechanism of the Treuille system was employed a metallic cup obturator fixed in front of the fermeture screw, while with the Wahrendorff system the obturation was assured by means of a pasteboard cup obturator, such as the Prussian and Belgian artillery employed at that time.

The metallic obturator gave very good results in the way of obturation, but the expansion of the steel cup caused in the bronze of the gun an upsetting in the form of a groove. Also, although it was fitted with this cup, the Trueille mechanism only functioned with constantly increasing difficulty, and they were obliged to have recourse to the use of a lever to open the breech.

24 The obturator cups in stamped pasteboard, solid or hollowed out at the center and fitted at the circumference with a band of brass, gave also under normal conditions good obturation and did not offer the same inconveniences as the metallic cup. Accordingly preference was given to them, and in the experiments made at the camp of Chalons with the six new guns they were employed to the exclusion of every other mode of obturation.

However, it was recognized that it was indispensable to fasten these cups to the cartridge, not merely to avoid all neglect and increase the rapidity of the loading, but particularly to permit fitting them more exactly against the front piece of the movable breech, an indispensable condition in order that the obturation should be complete. In order to better insure this contact, they had fixed to the cartridge case, above the powder, a padding of horsehair, the thickness of which was varied at will, according to the weight of the charge, so as to always pre-

[a] Prussian Artillery (Revue d'Artillerie, Vol. I, p. 13).

serve the same length of the cartridge case. This elastic mattress, serving as a spring, held the cup against the fermeture mechanism.

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4-pounder breech-loading guns.—Even in the month of May, 1868, Colonel Olry, relying on the results obtained in the preliminary tests carried out by the School of Versailles with the two first breech-loading 8-pounder cannon, proposed to convert also some 4-pounder guns to breech-loading, in order to study more fundamentally the question of bronze breech-loading field guns. The minister approved this proposition.

In order to have the conditions of resistance more favorable than those under which the converted 8-pounder guns had been, and to reserve a sufficient thickness for the walls of the chamber, they took two new guns which had not yet been bored. They were given a caliber a little less than that of the regulation 4-pounder, 78 mm. on the lands and 81 mm., 2 at the bottom of the grooves, in place of 86 mm., 5 and 92 mm., 1. The two guns received, one the Treuille de Beaulieu mechanism, the other the Wahrendorff mechanism.

Rubber obturator.—They used at first with these guns, as with the 8-pounder guns, the cup obturator of pasteboard, which was later replaced by a rubber ring, in consequence of tests made at the School of Versailles on this new method of obturation. Experiment had shown in effect that if under normal conditions the pasteboard cups gave good obturation, nevertheless they involved numerous inconveniences from a practical point of view.

This movable obturator, which had necessarily to be fixed to the cartridge, was an embarrassment; it complicated the arrangement of the chests and was exposed to injury in transportation. Its introduction in the chamber required a certain skill; it could be placed with greater or less regularity. If it was not just right it did not fit exactly against the head of the plug of the mechanism, the obturation might be incomplete and even entirely fail. Finally, after each shot, it was necessary either to withdraw the cup with the hand or to drive it with a blow of the rammer. All these inconveniences disappeared with the use of a fixed obturator; the cartridge became then as simple as for muzzle-loading guns; the cup and the horsehair mattress were suppressed; a greater or less length could be given to it without the obturation suffering thereby. Loading thus became much more simple, more sure, and more rapid.

The metallic cup which had been used with the first piece provided with the Treuille mechanism not having given good results, the idea was entertained of applying to the guns the method of obturation which had just been adopted for the firearm of the model of 1866.

Even in 1858, on the occasion of the application of the breech-loading system to naval guns, the Emperor called the attention of Commandant Treuille de Deaulieu to the advisability of obtaining good obturation by the use of india rubber. As this officer had no breech-loading gun then at his disposition, in order to be able to study the manner in which rubber acted under the action of the powder gases

he had constructed a small device consisting of a movable piston whose stem carried a small rubber ring which engaged freely in a fixed piston. This device had been placed in a 12-pounder gun, the fixed piston supported against the base of the bore. At the end of a very few shots the ring was put out of service. These unfavorable results, due in part to the defective means used in the experiment, produced a complete misleading impression and caused a prompt abandonment of these tests. As at the same epoch they had succeeded in obtaining by other means an almost satisfactory obturation, the experiments with rubber were laid aside for ten years. They were resumed in 1868 at the instance and in accordance with the ideas of Major Montluisant, then assistant director of the workshop of precision.

The trials of 1858 caused the fear that if the rubber was too suddenly compressed by the action of the powder gases, there would be produced at each discharge a violent reaction which at the end of a short time would seriously damage the obturating ring. Therefore they were anxious at first to deaden the pressure which the rubber would have to support. The arrangements adopted to this end were composed of a rubber ring supported in the rear against a shoulder made in the breech and covered in front by a metallic ring doing the work of a piston. This piston was, itself, protected by a metallic circular fixed ring, in diameter a little less than that of the former, so that the gases could only act on the piston by a circular zone left open by a fixed ring. When it was desired to increase a little the action of the gases, either the edges of the piston cover could be trimmed off, or a greater or less annular clearance could be left between the piston cover and the piston.

In this way numerous trials were made while varying the thickness of the rubber ring, its height, its diameter, the surface of action of the gases, the stroke of the piston, the consistency of the rubber, etc. But the results obtained were generally mediocre and very irregular; the obturators deteriorated rapidly, the obturation was often insufficient, and the working of the fermeture apparatus difficult.

This way was then abandoned, and it was attempted to see whether the reaction of the rubber compressed at full pressure was actually as violent as had been supposed.

The rubber ring was mounted on a stem, which was arranged in the breech block, and could move freely as well around its axis as in a longitudinal direction. This stem received directly the pressure of the gases and transmitted it entire to the rubber ring.

This new arrangement gave excellent results from the point of view of obturation, only the chamber became fouled as before around the movable head, which rendered the movement of the breech plug very difficult. To do away with these inconveniences, the diameter of the head of the piston was diminished throughout the whole front portion, only leaving at the rear a shoulder of very slight thickness to sustain the rubber. Thanks to this simple modification very good results were obtained.

The School of Versailles was then charged with trying this new mode of obturation. It used for these experiments the two first 8-pounder converted guns which had already served for the preliminary trials of breech-loading.

The obturating ring which was used was composed of a middle section of supple rubber placed between four other rings of less thickness, the two outside rings being of hard rubber, the two intermediate sections of semihard rubber.

The obturation was constantly good, the working of the breech easy, and the reaction of the rubber did not injure the mechanism. The rings generally remained in good condition; some of them, after more than 150 shots, still obturated in a very satisfactory manner. The one which acted the least well was still able to resist a rapid fire of 64 shots without being worn out, and although seriously injured could yet serve for 30 shots without creasing to obturate. Therefore this system of obturator was applied to two 4-pounder breech-loading guns which had just been tested.

But when it was desired to submit to the first firing test these two guns, which had remained out of doors in midwinter during nearly two months, exposed to all the inclemencies of the season, it was perceived at the first shots that the obturation was completely null, and the rings, having been unable to regain their elasticity during the firing, were soon put out of service.

Other rings were then made, composed in the interior of a section of the most supple rubber that could be found, protected at its circumference by a ring of ordinary rubber and on its forward and rear by two sections, one of them of half-hard rubber and the other of hard rubber. Before being fitted to the breech plugs, these new rings remained exposed during three days and three nights to the open air in temperatures which went down to 10° below zero (Centigrade). Nevertheless, they gave perfect obturation from the first shot. The temperature not being low enough to make it possible to test the influence which a prolonged chilling would have exercised on the rings, it was sought to obtain an increased effect by artificial chilling carried on in a closed vessel.

26 These rings always gave a perfect obturation and lasted long enough for their use to be considered quite practicable (177 to 205 shots). The obturating mechanism formed a simple movable head, held by means of a stop screw, which engaged in a slot made in the end of the stem, offered, moreover, the greatest facility for replacing rings.

The question of obturation by rubber was then practically settled, although, nevertheless, it was feared that by desiccation or under the influence of a too prolonged cold, the rubber, losing a part of its elasticity, might become incapable of insuring obturation.

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409.

At the beginning of the year 1869 Colonel Olry started a new project of a long-range 4-pounder bronze breech-loading gun, which

should satisfy these (ballistic) conditions. But the minister having then decided that the experiments in regard to breech-loading should first be made upon the 24-pounder and 8-pounder guns, the propositions of Colonel Olry were not followed.

410.

8-pounder breech-loading gun of reduced caliber.—As a means of obturation, the rubber rings which had just given good results with the last guns which had been tested were preferred to the pasteboard cups.

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411.

Two guns of this model were entirely finished at the beginning of the year 1870. They only differed from each other in arrangements of details; in one the bore and the chamber were concentric, while in the other the cylinder of the chamber was eccentric from that of the bore by the difference of the radii of the chamber and of the bottom of the grooves, so that the cylinder of the chamber and that of the bottom of the grooves were tangential along their lower surfaces.

They were sent to Versailles for a comparative firing test with an 8-pounder rifled muzzle-loading gun. In consequence of the military events of the year 1870, there was only time to fire one of these guns, that in which the bore and the chamber were concentric. It was therefore impossible to ascertain whether the eccentricity of the chamber exercised any influence whatever on the results of firing or on the preservation of the gun. The few shots with this gun showed that although it possessed a remarkable accuracy, it had not a sufficiently

412.

extended trajectory; the initial speed was only 341 meters. The mechanism of the fermeture functioned well, but there was occasion to notice the inconvenience that there was in employing for obturation a substance as sensible to atmospheric variations and as uncertain in its manufacture and resistance as rubber.

24-pounder breech-loading gun.—If the first trials of breech-loading guns had not led to the adoption of a field gun satisfying the ballistic conditions which it was desired to obtain, they at least proved that the question of breech-loading could be practically settled. Many artillery officers, considering all the inconveniences there would be in introducing into a field battery guns provided with a delicate fermeture mechanism and obturator system, likely to become worn out and requiring much care, still combated the adoption of breech-loading field guns; but for service in fortified places and in siege batteries the advantages of this new mode of loading were no longer contested.

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414.

Two guns of this model were ready to undergo firing tests at the beginning of the year 1870, and they were even tested at Versailles

in comparison with the muzzle-loading 24-pounder gun; but the declaration of war put an end to the tests.

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27 From the point of view of accuracy of firing, it did not give very good results. With a maximum charge of 2 k, 500 only an initial speed of 350 meters was obtained. The functioning of the fermeture apparatus left something to be desired; there was on one occasion a rupture of the pressure screw, the metallic block on which the bolt rested underwent a slight upsetting. The rubber rings did not always give good obturation.

In these new 24-pounder guns, as well as in the 8-pounder guns presented by the central depot and tried at Versailles in the month of July, 1870, no precaution had been taken to insure the lubrication of the bore; hence the loading was much more apparent than in the previous tests. After 25 shots it sometimes attained a thickness of 0 mm. 7 to 0 mm. 8. The guns then appreciably lost their accuracy.

Before the date of De Bange's invention, or the issuance of the patent in suit, there had been included in the use and operation of breech-loading guns the following elements and parts: A partially threaded plug, a headed pin extending through said plug, and a yielding packing arranged between the head of the pin and the inner end of the plug, in combination with each other and with the gun, to allow the pin to be driven rearward and compress the packing.

The evidence discloses that none of the foregoing inventions employed a gas check containing asbestos and tallow, though other forms of "yielding packing" were used.

The automatic sealing of the breech of a gun by the radial expansion of yielding packing, under the axial pressure of the head of a movable pin, driven rearward by the powder gases, was successfully accomplished in small rifles by the Chassepot invention, described in his patent No. 60,832. The three layers of rubber which compose the packing are concentric rings, the outer ring being the one which actually seals the breech. This gas check was adopted for the French army rifle in 1866, and was the regulation type until (after the Franco-German war) the metallic cartridge was substituted, dispensing with the need of a gas check in the gun itself.

The evidence discloses that the above invention was not successfully applied or used in field guns or cannon of large caliber, and is not now so used.

[From the "Revue d'Artillerie," vol. 13, pp. 18 to 24, published between October, 1878, and March, 1879.]

"EXPERIMENTS WITH OBTURATORS.

"Colonel Olry made trial in 1868 at Versailles of cup obturators of pasteboard covering the head of the cartridge. With these cups, with or without a copper ring, the obturation was perfect in firing heavy charges; only it was necessary to find the means of withdraw-

ing these cups after the charge had been fired. Different methods were proposed.

"It was attempted to extract the cup, either after firing by means of a hook in the form of a T, or automatically by forcing it to incrust itself by the very pressure of the gases upon the face of the breech-block, which, for this purpose, had cut into it square cavities, which were exactly reproduced in the cup itself.

"None of these methods having completely succeeded, the cups were abandoned, not only because of the difficulties which their extraction presented, but still more because of the impossibility which was found of using them in the firing of light charges.

"It is at this time that it was sought to apply to ordnance the mode of obturation then in use for the Chassepot gun. Commandant de Montluisant made trial at Versailles of rubber obturators. The first trials gave results satisfactory enough to follow them with experiments at Châlons and at Gavre. Rings were used, the center one being made of vulcanized rubber, very supple, covered only partially by layers of rubber of increasing hardness.

"These rings were tried at Gavre in a cannon of 24 c. They were supported by a movable head like that afterwards adopted for the Olry cannon. But the supple rubber, which was not covered in all parts by the harder rubber, forced itself in[illegible] the smallest joints, and the obturators, although efficacious, were destroyed at the end of a few shots by loss of material.

"Commandant de Montluisant having quitted the Atelier de Précision, Captain de Bange continued the study of the question.

"When, in May, 1872, the experiments with the Olry cannon were begun, the first guns tried—that is to say, steel cannon Nos. 3 and 4—were fitted with a rubber obturator in the style of those which before the war had given the best results. They were formed of a ring of supple rubber between two plates of hard and resistant rubber.

28 "The use as an obturator of a matter as elastic as rubber required that the dimensions of the obturator and those of its lodgment should be determined with the greatest precision. Captain de Bange thought that, if a nonelastic substance was used to form the obturators, so great a precision would not be necessary. Consequently, he proposed for the Olry cannon obturators of soap, which were tried in competition with those of rubber.

"*Rubber obturators.*—In regard to rubber obturators the commission had occasion to verify anew facts analogous to those which had already been observed in the preceding experiments—that it to say:

"With steel cannon, rupture of a movable head, attributed to an oblique blow resulting from differences in the elasticity of the rubber in different points of its surface; separation of the different washers composing the obturator.

"With bronze cannon. rearward spreading of the rubber as soon as the chamber began to be deformed.

"The commission, however, reported that with rubber obturators the working was always easy, the elasticity of the material restoring

the obturator to its primitive form as soon as the shot had been fired.

"*Soap obturators.*—The soap obturators proposed by Captain de Bange for the cannon Nos. 3 and 4 were of two sorts.

"One sort was composed of a washer of soap placed between two cups of molded leather. The cup, placed on the movable head, was protected from the action of the gases by a disk of thin brass, 0 mm. 2 in thickness. A metallic split ring placed on the opposite side held the edge of the leather at the height of the junction with the movable head. The soap used was ordinary white soap.

"In the other kinds the cups of thin brass of 0 mm. 3 in thickness replaced the leather cups. The soap employed was an olive-oil soap with an alkaline base.

"These obturators, which are the first obturators of plastic substance adopted by Captain de Bange, did not give satisfactory results. Under the influence of heat the soap became soft and ran between the walls of the chamber and the head of the breechblock.

"To escape from the inconveniences which resulted from this failure of consistence, Captain de Bange thought to place the soap in an envelope designed to cover it altogether. The obturators so constructed were employed in bronze cannon, then latter in steel cannon Nos. 5, 6, and 7.

"But the envelopes of serge, linen, or copper—that is to say, combustible envelopes—were soon burned, and, the soap being laid bare, the same inconveniences occurred as with the unenveloped obturators.

"Envelopes of lead, although incombustible, gave no better results. It happened sometimes that the lead, on account of its great inertia, rose up on the forward cup, which laid the soap bare and tended to make the action of the screw difficult.

"The cups of thin, soft metal between which the soap was held were themselves capable, by crushing and fastening themselves against the walls of the chamber, of occasioning difficulties in the working, although nothing of that sort was observed with obturators with leather cups. These latter cups, however, did not seem to have a sufficient resistance, for in the firing of cannon No. 5 the forward cup of a soap obturator was pierced and the soap laid bare against the movable head.

"Ordinary soaps having too great a fluidity, Captain de Bange proposed successively as a plastic obturating material:

"Soap with a base of lime, a gritty substance and but little plastic, which did not give very good results;

"Lead, which resulted in clogging and in inadmissible difficulties in the working;

"A mixture of talc and tallow, which presented the same inconveniences as the soap formerly used;

"Finally a mixture of tallow and asbestus.

"The first obturator in tallow and asbestus was tried with the Olry cannon No. 6, August 20, 1873.

"It was composed of seventy parts of asbestus to fifty of tallow. The plastic ring, held in place by a linen envelope, was kept between

two cups of tin. Copper split rings protected the edges of the rear cup; the forward cup had none. In order to prove the resistance of this obturator it was subjected to several rapid firings. It always acted well.

"Since that time only the mixture of tallow and asbestus has been used as a plastic material, and investigations have only been directed to secondary points, such as the best proportion of grease to be used and the greater or less expediency of fitting the forward cup with a copper split ring. A pressing back of this ring on the movable head was feared, an inconvenience that had been observed with the thin brass cups.

"But these last investigations belong to subsequent series of experiments in testing the Olry cannon. They will not be discussed here.

29 "In its report of November 4, 1873, the commission agreed that a good obturation was obtained in a practical and durable manner with the obturators of asbestus and grease. The committee, admitting this conclusion, thought that one could thenceforth consider the obturator of asbestus and tallow, with cups of tin, as a satisfactory solution for field pieces. The experiments carried on since that date have completely justified this verdict.

"*Movable head.*—In the beginning the bronze cannon of the Olry system had movable heads of rectangular section. The steel cannon, Nos. 5, 6, and 7, had the same shape. The tests to which these cannon were submitted showed that it often happened that dirt, adhering either to the movable head or to the walls of the chamber, lodged between the two and rendered the working very difficult.

"This inconvenience was remedied by rounding the movable heads and giving them what is called a mushroom form.

"*Berger proposition.*—Captain de Bange, when noting in the month of November, 1872, in a paper on obturators, the inconveniences to which elastic obturators had given rise during the experiments at Châlons and at Versailles, thought that they might have been avoided by an initial compression given to the obturator. But he added that it had not been done in order not to complicate the breech mechanism.

"Captain Berger, more impressed doubtless with the inconveniences due to elasticity in the rubber obturators than to those resulting from an over complication of mechanism, proposed a mode of initial tightening for those obturators.

"The application of this was made to the Olry bronze cannon No. 1, whose chamber had become enlarged, and in which obturators, whether of rubber or of soap, deteriorated rapidly.

"The stem of the movable head was lengthened so as to extend right through the breech screw and to be freely moved. The extremity of the stem, threaded, received a nut fitted with a handle. A longitudinal groove in which a guide moved prevented the stem from turning in its lodgment when the nut was screwed down to compress the obturator.

"The experiments took place in October, 1873. Some charges fired with obturators of talc and with obturators of rubber of ordinary thickness gave rise, in spite of the preliminary pressure, to habitual accidents, losses of material, ruptures of movable heads.

"A curious fact may, however, be related. In increasing the thickness of the washer and in carrying it to 40 millimeters, a system of obturator was obtained which worked with regularity, although the gun was notably swollen.

"A washer of this thickness resisted perfectly in a series of experiments executed with a charge of 1,300 grammes of powder A 1 (Vo=500 metres), although the cannon burst at the 249th discharge. One may notice here the good results which were obtained at that time with the movable head with a long stem, to which Captain Berger had recourse to try his process of initial tightening.

"To sum up: If the De Bange obturator solved the question of obturation in the case of guns of a sufficiently invariable profile, the Berger system, more complicated, it is true, might be a solution for guns whose chamber is exposed to getting out of shape."

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III.

The requirements to be met by the gas check of a large gun are of a very severe character. It is subject to pressures of from 30,000 to 40,000 pounds per square inch, to very high temperatures, to the effects of corrosive gases, and to the effects of repeated and violent shocks. The determination of a material or composition of matter capable of performing with requisite certainty the function of sealing the breech, and capable also of resisting without impairment the effects of the powder explosions, and which should not get out of order by reason of the concussions and high temperature to which it is subjected in action, and which should form, with the other elements of its breech mechanism, an operative combination or mechanical organism, presented many and difficult problems, the solution of which necessarily required practical test and demonstration under actual service conditions.

IV.

The earliest reference to the De Bange system of obturation appearing in any publication in the United States, so far as the evidence herein discloses, was in Ordnance Notes No. 292, April 20, 1883, which is as follows:

"There is no doubt that breech-loading artillery presents so many advantages that it would long since have been universally adopted had a really satisfactory breech-loading system been devised. Enough has been said as to the desirability, and even the necessity, of loading powerful guns of modern type at the breech. It remains, then, to consider what particular system is best adapted to the requirements of general service, and in what manner earlier forms of

breech-loading failed to commend themselves to the minds of artillerists."

The idea of loading guns at the breech in place of the muzzle is not a new one, nor is it even comparatively modern. Attempts were made in this direction three hundred years ago, but the state of mechanical sciences at that time forbade success. No collection of mediaeval cannon would be complete without one or more specimens of the ingenious attempts made in this direction.

It appears that the best method to pursue in considering this question is to establish the desiderata of a perfect breech-loading system, and by the standard thus set up to ascertain which, if any, of the methods now generally known fulfills completely our requirements. These are:

(1) That it should completely stop all escape of gas. This is self-evident. However good in other respects, any system which fails to fulfill the above condition fails in its primary object.

(2) That it should not be easily put out of order. This condition, too, is a sine qua non. It can only be said to be second in importance to the first condition. The fact is, that if the first be not fulfilled the second is an impossibility. Nothing that can easily be put out of order through its own fault can ever be seriously entertained as part of a weapon intended for modern warfare.

(3) That it should not weaken the gun. In order to stand a comparison with a muzzle-loading gun of the same weight, it is evident that the breechloader should not be inherently weaker. Against bursting pressure there is no difficulty in securing an equality. It is in the longitudinal direction that most breech-loading systems fail.

(4) That all parts exposed to wear should be capable of being readily and easily replaced. This is almost a corollary of condition (2). Without it the gravest inconveniences would soon be felt. A system which, under favorable conditions, may stand 200 or 300 rounds, but which then requires the gun to be returned to an arsenal to be again placed in a serviceable condition, is inadmissible. Spare working parts should be capable of being replaced on the spot.

(5) Should be easy to work. Ease of working is essential to rapidity and continuity of fire and is one of the points in which a good breechloader has a very great advantage over a muzzle loader, especially when the gun and projectile become large and heavy.

31 (6) In order to fulfill the above it has been found by experience that no system is at all satisfactory in which the gas pressure of the fired charge does not tend to seal its own escape. What is required is that the greater the pressure the more complete and secure the closing. To be completely satisfactory the "obturation," as it is called, to borrow a term from the French, must be automatic, and not dependent of any perfection of fit of the breech mechanism.

We may now proceed to examine the various breech-loading systems commonly known, by the standard of the above requirements.

The earliest and best known is the Armstrong screw and vent-piece system. In this a vent-piece was dropped into its place vertically, and secured by being tightened up against the face of the tube of the gun by a hollow screw, through which the charge was loaded. This system did not fulfill any single condition enumerated above. (1) It did not stop all escape of gas, however tightly it might be screwed up, and however accurately the front of the vent-piece and the rear of the copper bouche in the gun might fit, some slight escape was always possible, and this rapidly increased as the gun was fired. Constant refacing and renewal of the parts in contact were required, and this was neither an easy nor expeditious operation. (2) It was easily put out of order, chiefly by the action of the gases on the joints. (3) The gun was weakened by the slot for the vent-piece, and by the necessarily great enlargement of the breech screw to allow of the charge being loaded through it. (4) As above stated, the parts subject to wear could not readily be replaced. It was an operating requiring special tools and skilled artificers. (5) It was not easy to work, and hence rapid fire was impossible; even for a gun of 7-inch caliber the labor of lifting the heavy vent-piece was great; it often stuck hard in its seat, and the position required of the men working it—that is, above the gun—entailed great exposure in action. (6) This was entirely unfulfilled. The pressure, on the contrary, operated as a force to open an escape for itself. There was no gas check, nor any means whereby the pressure tended to seal itself, except the clumsy device of a tin cup placed on the end of the chamber each round. This was only moderately successful, and was an extra operation.

Broadwell's breech mechanism, as copied by Krupp, is too well known to need description here, but even in its most approved form it fails under the crucial tests imposed by conditions (2) and (3). Reports have over and over again been made on it, stating that the greatest care is necessary to preserve the essential parts closing the escape of gas—that is, the Broadwell ring and the plate on the breech-block against which it rests—from accidental injury. A blow or dent or burn may so deform these delicate parts as to cause an escape of gas, which once established rapidly develops, and if neglected would quickly render not only the breech mechanism but the gun itself unserviceable. Moreover, the slot cut for the breech-block must to a certain extent weaken the gun longitudinally. Again, ease of working is dependent on the most scrupulous care and perfect lubrication of the movable parts. However, the enormous number of guns made on this system by Krupp and by Mr. Broadwell is the best proof of the practical value of the arrangements.

A system which appears to fulfill the conditions above laid down with very good success is that now known as the French, or interrupted screw system. In this the breech-block has a thread cut on its outer surface, the circumference being divided into, usually, six equal parts, from three of which the thread is entirely cut away longitudinally.

A similarly divided thread is cut in the breech of the gun. It is evident, then, that the breech-block can be pushed home, the projecting portions of the thread on it entering the cut-away parts in the gun. A sixth of a turn of the block causes the threads to lock in those cuts in the tube of the gun. Various methods of preventing unscrewing on discharge have been devised, but none appear so satisfactory as that adopted in the French service, due to the Com-
evident, the', that the breech-block can be pushed home, the pro-
mandant de Bange. In this the lever which is used to effect the turn-
ing of the breech-block is made to fold down, a short projection
32 then engaging in the ring-carrier supporting the breech-block,
which thus is absolutely prevented from turning until the lever be again raised.

This ring-carrier is hinged to the gun, and the breech-block on withdrawal is supported by it and swung aside clear for loading.

Two principal means of stopping the escape of gas from guns fitted with breech mechanism of this pattern have been tried. The first, in England, by Sir W. Armstrong & Co., is a steel cup, plate 1, fitted to the front of the block, which is slightly convex. The cup, when the breech is screwed up, abuts against a shoulder in the gun, where, also, a copper ring is fitted for it to expand against; the last forward motion due to locking should cause this cup to bear hard against the shoulder. On firing the cup expands, but on the cessation of the pressure regains, from the elasticity of the metal, its former dimensions, and can be withdrawn.

In France, however, the De Bange method has been adopted for land service. In this a large mushroom-headed piece of steel is fitted to the block, the "stalk" passing through it (Plate I). The mushroom head fits the bore tolerably closely, and between it and the face of the block, on the stalk is placed the "obturator" pad. This consists of two plates of tin, strengthened at the edges by thin brass rings, and containing between them a ring of asbestus and grease, inclosed in a canvas bas and pressed between the tin plates into its proper shape by heavy hydraulic pressure. On firing, the head is pressed back by the gaseous pressure, and causes the pad to expand, tightly filling the bore, and completely sealing all escape of gas. The system taken as a whole appears from French accounts to be excellent. Conditions (1), (4), (5), and (6) appear to be perfectly fulfilled, and (2) and (3) as far as there is any present probability of their being fulfilled at all.

It is with regard to (2) and (5)—tha. is, non-liability to be put out of order and to ease of working—that it appears to be better than the cup system. A single blow or dent on the cup or the copper ring at its seat would cause an escape of gas, and rapidly put the breech action hors du combat until both were replaced. The obturator pad may be, so we are told, battered without destroying its efficiency. The first round will restore it to shape, and that without allowing any escape of gas. With this latter method of closing all escape of gas, too, no great accuracy of workmanship or care in

fitting is required. The cup requires both to a very high degree. Its ease of working, too, is dependent on this, as well as through cleansing to avoid sticking in its seat.

On the whole, then, we may conclude that a really satisfactory breech-loading system has been devised, and actually adopted in France. The chief and only defect, as far as we know at present, of this De Bange system is that the pad and mushroom head take up a large amount of room as compared with the Armstrong steel cup. In fact, the bore is shortened by exactly their united thickness. Taking all, however, into consideration, it does not appear that this disadvantage counterbalances the many advantages possessed by the De Bange gas check. It is impossible, within the limits of space available, to notice the many ingenious but useless methods of breech-loading which have from time to time been proposed. They all alike have failed under the necessities imposed by actual use on a large scale. One other gas check has given such good results at least in small cannon that it is worthy of notice. It is the invention of Capt. Luis Freire, of the Spanish army, acts in a manner somewhat similar to the De Bange, and appears to very satisfactorily fill the six requirements given above.

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TRIALS.

[Translated from the Memorial de Artilleria.]

The superior executive council have recently carried on, at the proving ground of Carabauchel, some interesting experiments for the purpose of comparing the regulation steel-ring obturator, that of Captain Freire, and one of the De Bange system adopted in France, and also for a special piece in the Italian service. The De Bange obturator was made at Seville from plans obtained abroad by Lieutenant-Colonel Plasencia during one of his late journeys. This so-called plastic obturator is applicable to the closure with an interrupted thread. It consists of a round perforated disk formed of a mixture of asbestus and tallow inclosed in strong cotton cloth and subjected in a hydraulic press to preliminary compression proportional to the pressure expected to be developed in the bore by the powder gases. The disk is inclosed between two tin cups with brass corners, which separate it in front from a solid piece of steel called the mushroom, upon which the gases act directly, and in rear from the body of the screw closure, in which there is a lodgment, for the axis or stem of the mushroom which passes through the cups and the disk. At the surface of contact the closure has the form of a cylinder with a rounded head slightly conical at its anterial part which enters the chamber; and the obturation is effected completely by the increased diameter given to the disk by the pressure exercised on the head of the mushroom at the instant of firing, closing completely by the expansion between the tin cups the slight windage which exists between the obturator and the walls of the chamber.

After the excellent results obtained in former proof of the Freire obturator, of which a description was given in the Memorial for February and March, 1881, all competitive trials with other obturators could have been dispensed with, because, the former satisfying completely all imaginable conditions required in the most perfect system of obturation, it was not presumable that the asbestus disk would offer superior advantages. The executive council, doubtless induced by its ceaseless anxiety to perfect the matériel without permitting half proof or trial of anything that might contribute to the good of the service, desired to see a practical confirmation of that which theory and simple common sense appeared to indicate merely from an inspection of two systems essentially different, both in the materials of which they were composed and in the ideas which served as their bases.

The Freire obturator, in fact, attracts us at once by the originality of the principle on which it is based, by the simplicity of its mechanism, and, above all, by the perfect conformity of its action with the natural laws of mechanics. Knowing the theory of the system it is hardly conceivable that it can fail to act in any case, either at the beginning or end of a series of shots, and practice, furthermore, irrefragably proves this to be so; all in it is logical, natural, exact, unchangeable. The plastic obturator, on the contrary, seems devised on purpose to contradict the vulgar aphorism that "matter has no whims." Any one would suppose that obturation being obtained by a substance so devoid of elasticity as a disk of asbestus and tallow, the edges of the latter would remain adhering firmly to the walls of the bore after each shot, impeding easy manipulation of the closure; and on the other hand that the plastic material, being expressed beyond the superficies of the cups between which it is compressed from the effect of the violent pressure that it endures, would begin to tear the cloth that covers it, pressing back the mixture over the posterior edge of the cup and locking the breech, thus rendering the service of the piece impossible. This certainly happens after a greater or less number of rounds, but the effects are produced so slowly and increase so insensibly that even after the compression of the disk and the tearing of the cloth the apparatus, all presumptions to the contrary notwithstanding, continues to work without great difficulty, and in view of the facts it must be recognized that if the plastic obturator does not resist the examination of a prudent critic, it resists very well what is more to the purpose, the firing of the piece under the most unfavorable conditions of service.

The endurance of the disk, and pro tanto the resistance of the obturator, appears doubtless to depend principally on the proportion of tallow in the mixture and on the perliminary compression to which it has been subjected in the hydraulic press, which should, as has been stated, bear a certain relation to the pressures developed in the bore of the piece for which it is intended. In an experimental
34 mountain gun of 6.5 cm. (2.56 inches) caliber, in which the plastic obturator was first tried, only 45 consecutive shots

could be fired. The rapid destruction of the disk, which was prepared with the same mixture and in the same manner as in the regulation mountain gun of 8 cm. (3.15 inches), in which the pressures are much less, was attributed to the plastic mass not having been subjected to an initial compression sufficient to resist the higher tensions of the experimental 6.5 cm. (2.56 inch) piece.

After this first trial, which may be considered as incidental, the experiments were confined to three short regulation mountain guns of 8 cm. (3.15 inches) caliber, one provided with the Freire obturator used in former proofs of this apparatus, another with the plastic obturator made at the bronze foundry, and a third piece with the regulation steel ring.

In order to equalize to as great an extent as possible the conditions of the plastic and Freire obturators, the latter of which had already undergone 258 rounds at Seville and Carabauchel, 100 of them in a single series, without cleaning, lubrication, or even light sponging, a series of 100 rounds was fired with the plastic obturator under the same unfavorable conditions. It was observed after the first rounds that the disk of asbestus continued increasing in diameter, very gradually forming a slight superficial distortion between the edges of the tin cups that inclosed it. After 40 rounds, it was observed further that the plastic material began to be pressed out over the edge of the posterior cup, bursting the cloth for a length of 9 to 10 mm. (0.35 to 0.39 inch), an effect which soon was exhibited at other points of the periphery of the disk. In spite of this, the plastic obturator continued to work well, and the series ended without any difficulty in opening or closing the piece, resulting from the increased diameter of the disk or the exudation over the posterior cup. The closure bound in the last rounds, causing difficulty in turning the screw, but the combination of the disk and its cups closed the joint satisfactorily, without permitting any escape of the gases, or at least without any traces appearing on the piece or the elements of obturation.

Having obtained from this experiment sufficient data to appreciate the efficacy of the plaster obturator and its endurance and efficiency during firing, proof was undertaken to compare it with the regulation steel ring and the Freire obturator. For this purpose, and in consideration of the deterioration which the disk had undergone in the previous experiment, the obturator was replaced by a new one of the same kind received also from Seville. As a result of this second proof, in which 30 rounds were fired with the pieces provided with the Freire and the plastic obturators, and 26 with the piece having a steel-ring obturator, the predicted inferiority of the last to the other two was apparent, since whilst the plastic and Freire obturators operated satisfactorily without either cleansing or lubricating, it was necessary to clean and oil the steel ring after every four of five rounds, as otherwise great labor was necessary in opening or closing the piece.

Leaving out of consideration, then, the regulation obturator, which evidently could not sustain a comparison with the other two, the proof was limited to a comparison of the two new systems, using the plastic obturator which had already endured 100 rounds and the Freire which, as stated before, had borne 258. In this experiment a series of 100 consecutive rounds was fired with each of the obturators without either cleaning or lubricating the apparatus except after the first 20, and during the remainder of the series merely using a dry sponge and oiling the console when any difficulty was noticed in the movement of the closure, a circumstance independent of the system of obturation, since the fouling of the console in these closures with central ignition results from the gases and residuum which escape through the vent. Both pieces were served without difficulty, the apparatus checking the gas perfectly, and being easy to manage in spite of the failure to clean the parts.

The minute examination made of the two obturators after this last experiment showed that unchangeability of all the elements of the Freire obturator which is its characteristic condition, and by virtue of which it works with the same ease and precision in the first as in the last of a long series of rounds fired as rapidly as the service of the piece will permit. As to the plastic obturator, it was noticed, as in all the proofs, that the asbestos disk was greatly compressed against the edge of the posterior cup, and tore the cloth at various points; moreover, the disk or the combination of the disk and the tin cups had diminished about one-half of a millimeter in thickness, leaving a space of this dimension between the obturator and the body of the screw; but, as was before remarked, the mechanism closed the joint completely in all the trials, and in view of this fact it was impossible to determine its endurance or to obtain any indication as to the moment when it would be proper to substitute a new one. In the course of these experiments it was observed that the operation of changing the disk was not so rapid or simple as would at first appear, since during the firing the tin cups undergo a considerable compression in the direction of the axis and remain firmly adherent to the steel stem of the mushroom, requiring a considerable effort to withdraw them from it, which is necessary in order to separate the disk, which adheres firmly to the cups by reason of the portion which is squeezed out exuding upon them.

36

To recapitulate, the late experiments at Carabauchel confirm the flattering opinion preconceived as to the Freire obturator, and have also shown the efficiency and endurance of the plastic one (which is very superior to that of the regulation ring), and its favorable conditions for service, since it can work, as does the Freire, for a great number of rounds without necessitating cleaning or even sponging.

These circumstances explain why the De Bange system has been adopted by other nations, France having adopted it for almost all of its pieces except those of the navy (as the artillerists of the fleet oppose its adoption), and Italy having adopted it for a new piece of

12 cm. (4.72 inches) caliber. In Spain, since the invention of Captain Freire, which solves the problem of obturation in a more satisfactory manner, the conditions are very different, since even under the hypothesis that the two obturators act with equal perfection and facility in the ordinary service of the piece, there will always remain in Freire the advantage of presenting a solid, unvariable, and permanent combination which will endure as long as the piece without requiring a renewal of any of its elements. The asbestus disk is always burdened with an uncertainty as to the moment at which the injured disk will cease to act, and it may be necessary to replace it, perhaps, under the most critical and perplexing circumstances of battle. Finally, the use of the Freire disk is advocated by the circumstance that it symbolizes a notable improvement which is exclusively national.

ORDNANCE OFFICE,
Washington, April 20, 1883.

Publication authorized by the Secretary of War.

S. V. BENET,
Brigadier-General, Chief of Ordnance.

The De Bange obturator was brought directly to the attention of the United States ordnance authorities on April 27, 1883, at which time the United States naval attaché at London, then Lieut. Commander F. G. Chadwick, forwarded to Lieutenant-Commander William M. Folger, of the Bureau of Ordnance, Navy Department, a detailed description of the De Bange gas check as it then existed, together with the following description of its method of making, furnished by the inventor De Bange:

[Translation of the description of the method of making gas checks, as given in Lieutenant Chadwick's letter.]

"The asbestos should be of the best quality and free from extraneous matter. It is pulverized and passed through a sieve. The tallow is put in a pan and heated until it begins to steam. The asbestos is then poured in and thoroughly mixed in by means of a wooden spatula. The proportion is by weight.

"When the material has been made homogenous, it is compressed in a mould similar to that used for rings of compressed powder. The edges are rounded, and then the cake is weighed, the proper weight having been previously fixed. The cake is then covered with cloth. For that purpose bands of cloth are cut to a suitable breadth, and the ends are joined so as to form cylinders which are placed inside and outside of the cake, and whose ends are sewn together after they have been cut with scissors, so as to fit more easily.

37 "The cups are formed of bands of laminated tin, whose thickness varies according to the caliber. The disks are cut out with a punch and then shaped by dies and moulds, care being taken that the thickness be diminished as little as possible at the

TO ACCOMPANY ORDNANCE NOTES No. 292.

PLATE I.

THE FREIRE GAS CHECK.

Fig. 1

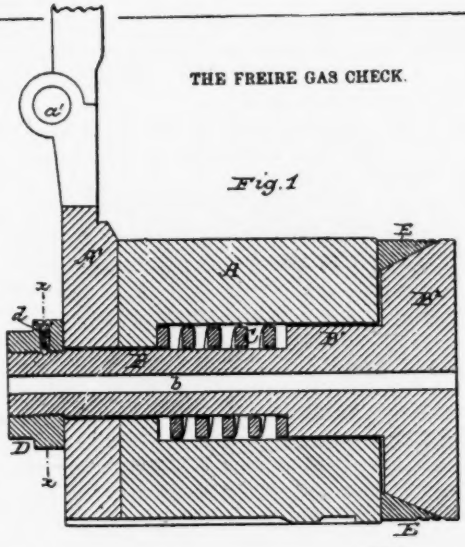


Fig. 2

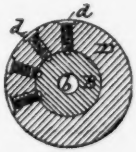
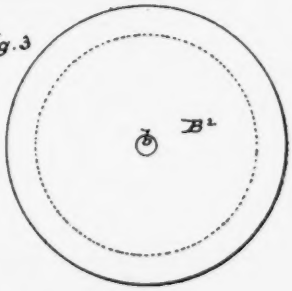
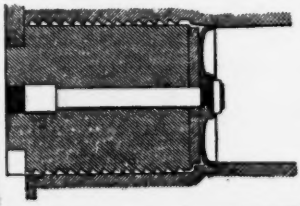


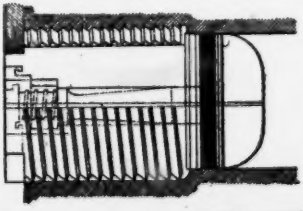
Fig. 3



THE ARMSTRONG GAS CHECK.



THE DE BANGE GAS CHECK.



angles, which should be rounded in this first stage of their manufacture. After being shaped, each disk is put on the lathe, the edges are trimmed to the proper height, then chiseled off inside.

"The rings are made of brass wire drawn through a gauge and not annealed, in order to preserve all the elasticity due to the cold hardening. The cross section of the rings is in the form of a right-angled triangle, but rectangular wire must be used to facilitate the winding. The last operation takes place on a reel by means of a cylindrical iron mandrel, on which the thread, whose end has been bent back at a right angle, is kept in place by the aid of a collar and a thumbscrew. As the mandrel turns it pulls strongly on the wire, and in this way one obtains a spiral spring whose coils touch.

"This spring changes its diameter when relaxed. It is then placed on another mandrel, also of iron, but larger than the first one, and the coils pressed down and joined together with soft solder. After being so arranged, this spring is cut on a helix whose pitch is so adjusted that the bevels made on each coil have a proper length, and moreover when the ends are brought together the exterior diameter is greater and the interior diameter smaller than in the finished ring.

"After the coils have been cut, the bevels are polished smooth. If there is room, the rings are rounded and soldered in order to place them on the mandrel.

"When all the elements are prepared, they are pressed together. The tools required include, first, a conical matrix of steel of the same shape (inclination) as the seat of the obturator, but of a little smaller diameter; second, a movable head of hard brass or steel like that of a cannon, but shorter and flat on top; third, a flat steel washer; fourth, a brass plug on which the pressure is exerted.

"First the movable head is placed at the bottom of the matrix, the wider end of which should be on top. Then the front ring, the front cup, the cake covered with cloth, the rear cup, and finally the two rear rings are successively put in place. On the top of all are placed the washer and the plug, and a heavy pressure is put on them. Each one of the elements takes its place, and the rings are lodged in the cups, the tin of which covers them lightly and keeps them in this position."

On July 5, 1883, Lieutenant Chadwick wrote the following letter:

"LONDON, ENGLAND, *July 5, 1883.*

"SIR: I have the honor to forward herewith a De Bange 'obturator,' which was kindly presented on request by the French minister of war.

"I am, very respectfully, your obedient servant,

"F. E. CHADWICK,
"*Lt. Comdr., U. S. Navy, Naval Attaché.*

"Commodore J. E. WALKER,
"*U. S. Navy, Chief of Bureau of Navigation,*
Navy Department, Washington."

V.

In 1883, by act of Congress approved March 3, 1883 (24 Stat. L., 474), a board was constituted known as the "Gun Foundry Board," composed of eminent officers of the army and navy, headed by Rear-Admiral Simpson, U. S. Navy, whose duties, among others, were to report on the establishment of a government foundry, "or what other method, if any, should be adopted for the manufacture of heavy ordnance adapted to modern warfare, for the use of the Army and Navy of the United States."

In the official report of this board reference is made to a visit to the claimant's works at Paris, France, on August 29, 1883, and to the inspection by said board of the De Bange system of ordnance. In the said report of said board is the following:

"*Breech fermeture.*—All the French guns are breech-loading, and are fitted with the interrupted screw system, as modified by Colonel De Bange to suit his gas check.

"*Gas check.*—'The De Bange gas check' is universally employed."

The references in the report of the Gun Foundry Board to the use of the De Bange gas check in France evidently related to its use in the French artillery and land service guns, since it appears that the French naval guns used the "cup gas check."

38

VI.

About the year 1884 the ordnance officers of the United States Navy Department began experimenting with the De Bange gas check. As a result of all the investigations and trials the De Bange obturator was adopted by the United States military and naval authorities, and all its heavy ordnance (5-inch caliber and upward) have been of that type since about 1885. Since the adoption of the De Bange gas check no gas checks of other types have been used in the service of the United States.

The United States Government has never disputed the title of claimant's assignor, Colonel de Bange, as inventor of the said invention; but, on the contrary, the said invention has, ever since its adoption, been known in the service of the United States as the "De Bange gas check," and is described by that name in the official reports of the Secretaries of War and of the Navy.

The following correspondence took place between inventor De Bange and the parties mentioned in said letters in reference to the use of said patent by the defendants herein:

PARIS, *June 29, 1891.*

Colonel de Bange to H. E., the Minister Plenipotentiary of the United States.

Mr. MINISTER: In order to respond to the desire expressed by your excellency in the letter which you have done me the honor to address to me, I add some details to my preceding observations.

One of my patents bears the number 331,618; it relates to gun carriages; it is not very important because one can do without it; but the second, No. 301,220, which is connected with the obturation of guns and breech mechanism is of the highest importance. Without my obturator the loading of a gun by the breech is difficult and the service is rendered ineffectual. The metallic ring used in Germany is far from having its value and imparts to the gun a considerable inferiority. Thus all the makers of cannon are led to employ my invention, either openly or in a disguised form, styled by them improvement. The War and Navy Departments at New York, which are well acquainted with the question, will certainly not contest the truth of my assertions; they have under their eyes, on trial, guns which speak for themselves.

This is not the first time that I have to complain of my idea being borrowed without my knowledge in France or abroad. The English Government particularly had taken up my system, and without my having demanded anything had offered me twenty thousand pounds sterling to indemnify me. I refused this offer, it is true, but because as a French officer I ought not to aid in the arming of a power which I do not consider as friendly. In part, deprived of my assistance, England has copied me badly and possesses but a moderate artillery.

In any case, I appeal to the sentiments of equity of the Government of the United States, convinced that it will recognize easily the justice of my claim.

Pray accept, &c., &c.,

(Sgd.) Colonel DE BANGE.

39

UNITED STATES LEGATION,
NAVAL ATTACHE,
Paris, July 2nd, 1891.

Hon. WHITELAW REID,
Envoy Extraordinary and Minister Plenipotentiary of the United States of America, Paris.

SIR: Referring to the enclosed letter from Colonel de Bange, I would respectfully suggest:

1st. That a copy of said letter be sent direct to the Navy Department.

2nd. That Colonel de Bange be advised to apply directly to the Navy Department concerning a recognition of his rights there.

It is a fact that the obturator used in some naval guns is currently spoken of as the "De Bange gas check." I am unable to say to what extent this obturator may be an infringement on rights possessed by Colonel de Bange.

Very respectfully, Sgd. AARON WARD,
Lieut., U. S. Navy, Naval Attaché.

LEGATION OF THE UNITED STATES,
Paris, August 6, 1891.

SIR: Sometime ago Colonel de Bange, a retired French officer, addressed to me a letter complaining that the United States was using

several of his patented inventions, without payment, and asking if, through the medium of this legation, he could not have his grievances remedied. I replied, explaining that I was unable to commit my Government in any way on the subject, but adding that if he would give me specific information I would see if the facts could be communicated to you.

In reply to this he has sent me a letter, of which a copy and a translation are herewith enclosed. This correspondence I referred to Lieutenant Ward, naval attache to this legation, a copy of whose report is also herewith enclosed.

I have given Colonel de Bange the advice recommended by Lieutenant Ward, namely, that he appeal to the Navy Department concerning a recognition of his rights there. I have thought it better, however, instead of forwarding the correspondence direct to the Navy Department, as suggested, to forward it to you, as usual, for such disposition as may seem to you proper. I have the honor to be,

Very respectfully, your obedient servant,

WHITELAW REID.

Hon. JAMES G. BLAINE,
Secretary of State.

40 VERSAILLES, NEAR PARIS, 16/8/91.

Colonel de Bange to Monsieur Benjamin F. Tracy, Secretary of the Navy at Washington.

MR. SECRETARY: Some months ago I addressed the United States minister at Paris, verbally and by writing, several remarks on the subject of loans which I had made of my invention to the departments of War and of the Navy; finally, as I have undertaken to write to you directly, I now have the honor to lay before you the following:

I had taken out letters patent, which treated of artillery in the United States, one number, 301,220, relative to l'obturation of guns, and of principal importance; the other number, 331,618, relative to the carriage.

Furthermore, I have seen at Paris many of your officers to whom I furnished without reserve all the information which they have asked of me.

Under these circumstances I hope that if the Government has desired to utilize my inventions, it will inform me; there has been no defect, and I have learned from a reliable source that my systems was copied, unknown to me, by the departments of War and of the Navy, be it under the disguise of an improvement or be it openly.

I regret that this has occurred, but in any case I consider that an indemnity is due me. If you will have the kindness to notify the Government of my claim, I am confident that it will see that justice is accorded me in the indemnity to which I believe myself to be entitled.

Please accept, Mr. Secretary, the expression of sentiments of highest consideration, with which I am

Your obedient servant,

DE BANGE.

Please reply.

DEPARTMENT OF STATE,
Washington, August 20, 1891.

The honorable the SECRETARY OF THE NAVY.

SIR: I have the honor to transmit to you herewith, for your information and consideration, a copy of a despatch, No. 400, of the 6th instant from Paris, relative to the alleged claim of Colonel de Bange against the United States.

I have the honor to be, sir, your obedient servant,

WILLIAM F. WHARTON,
Acting Secretary.

41 [Second endorsement.]

No. 4224.

BUREAU OF ORDNANCE, *August 27, 1891.*

Respectfully returned to the honorable Secretary of the Navy.

The bureau has not manufactured and is not using any gun carriages which contain principles which could be held as infringing any claims secured in United States patent No. 331,618. The gas check which has been adopted for the naval guns of 6-in. calibre and upwards resembles in certain features that described in United States patent No. 301,220, issued to Col. de Bange. It also differs from it materially in particulars which are original in this bureau.

I am not in position to give an opinion as to the question of infringement, and have to suggest that the applicant refer the matter to the Court of Claims.

The bureau will note for the information of the applicant that there are no funds appropriated or available for the payment of any claim that might be allowed by the Court of Claims, and that it will be necessary for the applicant to go to Congress for relief in the event of a decision being obtained which will warrant such action.

(Sgd) WM. M. FOLGER,
Chief Bureau of Ordnance.

NAVY DEPARTMENT,
Washington, September 3, 1891.

SIR: I have the honor to acknowledge the receipt of your communication of the 20th ultimo, enclosing copies of correspondence relating to a claim of Colonel de Bange, a retired officer of the French army, residing in Paris, France, who alleges the use by this Government of certain inventions patented by him in guns and gun carriages.

In reply I have to state that the Chief of the Bureau of Ordnance, in this department, to whom the communication and accompanying papers were referred, reports as follows:

The bureau has not manufactured, and is not using, any gun carriages which contain principles which could be held as infringing any claims described in U. S. patent No. 331,618.

The gas check which has been adopted for the naval guns of 6-inch calibre and upwards resembles in certain features that described in U. S. patent 301,220, issued to Colonel de Bange. It also differs from it materially in particulars which were orginal in this bureau.

In view of the statement made by the Chief of the Bureau of Ordnance, there appears to be no proper ground for the claim of Colonel de Bange.

Very respectfully,

F. M. RAMSAY,
Acting Secretary of the Navy.

The honorable the SECRETARY OF STATE.

42

VII.

The De Bange obturator is described and its advantages discussed in many technical publications and official reports.

In Lieutenant-Commander Ingersoll's text-book on ordnance in use at the United States Naval Academy (ed. 1894), after stating the conditions which a breech mechanism should fulfill, says:

"The interrupted screw system combined with the De Bange gas check has been adopted for use with the B. L. R. guns for the navy as fulfilling the above conditions so far as there is any possibility of their being fulfilled at all."

And further—

"The advantages of the De Bange gas check are certainty of action, durability, and ease of adjustment. It requires no great accuracy of workmanship or care in fitting, and it may be changed in case of accident with little delay."

In Captain Metcalf's text-book in use at West Point Military Academy (ed. 1894) is the following:

"The Broadwell ring has to seal four surfaces not protected from dirt instead of but two, and the joint most difficult to seal is that which is most exposed to dirt.

"Of the attached gas checks the Freyre, being inorganic, is less subject to extreme variations of temperature; it also takes up less room in the thickest part of the gun. It is open to the objection that a slight nick on the edge of the ring might render the entire apparatus worthless.

"To the last consideration is due the almost universal employment of the De Bange gas check, since this has been found almost indestructible by the accidents of service and to resume its shape when deformed in the firing."

Also, in the Scientific American for June 17, 1893, describing the "Navy rapid-fire gun," is the statement that—

"There have been no cartridge cases as yet for the 6-inch quick-firing gun, the De Bange gas check being used for obturation."

In Engineering, an illustrated weekly journal published at London, for April 29, 1892 (Vol. LIII, p. 518), in an article entitled "Modern United States Artillery," occurs the following passage:

"Numerous methods have been tried at various times for closing the breech of guns, but at the present time the number has practically been reduced to two—the Krupp, or sliding-wedge system, and the French, or interrupted-screw system. Between the advocates of the two systems there has been great rivalry. It may, however, be stated that, with the exception of Germany, the various nations have generally adopted the interrupted-screw system.

"Among the latter nations is the United States. All the guns that have been built at the national foundry have breech-closing mechanisms of the interrupted-screw systems. This system has been adopted after long and careful criticism of the two methods. The United States in its isolated position has felt that it could wait while the conflict between the two systems was going on, and Congress was loth to appropriate money for the building of heavy guns until the superiority of some one system became evident. It can hardly be said with fairness that such a superiority has become manifest.

"It can be said, however, that both systems have proved themselves reliable, serviceable, and durable; each has its advantages over the other, and it becomes merely a matter of choice as to which advantage a nation considers the most desirable. The principal advantage of the Krupp system is its simplicity. It is, on the other hand, obliged to employ a much inferior gas check. A few grains of sand or slight fouling is sufficient to allow a slight escape of gas, and the erosion once begun will soon destroy the gas check."

43 Engineering has (vol. 49, p. 403 et seq.), in the number for April 4, 1890, an article entitled "The De Bange system," from which the following are extracts:

"It is very generally assumed to be a fact that French modern practice in the manufacture of ordnance is largely represented by the De Bange system, which forms a specialty of the Cail Company, and the almost universal manner in which some of the most important details of this system have been adopted attests clearly the value of the services rendered to gun constructors by the able director of the Cail works. Colonel de Bange has been obliged to resign his situation of general director of the Cail works nearly a year ago. In France, England, and the United States more than one special feature of the standard breech-closing mechanism in one form or another is that of De Bange, and its wide adoption is the best evidence of its practical value.

* * * * * * *

"The French breech-closing system of interrupted thread, which, with the exception of Krupp, is practically adopted by all gun manu-

facturers, is accepted as thoroughly trustworthy; thanks to its simplicity, lightness, and the rapidity with which it can be handled, the efficiency of modern ordnance has been vastly increased, and it was this system that was adopted, after long consideration by our own war department when, very tardily, we abandoned the crude and clumsy method of muzzle loading, to which we had clung with so much pertinacity long after it had been given up by other nations. As we have seen in previous articles, this system of breech closing is claimed by France for Treuille de Beaullieu and Verchere de Reffys. During the war of 1870 France possessed a considerable number of field guns fitted with the interrupted-screw breechblock, while nearly all of the heavy ordnance in the navy was constructed on a similar principle.

"Immediately after the termination of the war the first and most pressing care of France was to renew her armament, and it was at this time that Colonel de Bange rendered such signal services to his country. The imperfect method of breech-loading then in use was remodeled by him until it took the present well-known form; the modifications he introduced referring most particularly to the lever for operating the block, the arrangement of the latch, and, above all, the obturator, which was an adaptation of the gas check used in the chassepot rifle, and in which the rubber expanding pad was replaced by a packing of asbestos and suet that was found to make a very efficient gas check and to withstand the effect of high temperatures produced by the powder gases. These and some other improvements in detail converted the interrupted screw block into a thoroughly efficient breech-closing mechanism. Colonel de Bange, however, was not so fortunate with other details in his system."

VIII.

On January 31, 1894, the claimant, by its attorneys, addressed a substantially identical communication to the Secretary of War and Secretary of the Navy, stating its claim for the use of its said patented invention, and requesting the payment of just compensation therefor. The letter to the Secretary of War was as follows:

44 "WASHINGTON, D. C., *January 31, 1894.*

"The honorable the SECRETARY OF WAR.

"SIR: We have the honor to inform you that we have been retained and empowered by the Société Anonyme des Anciens Établissements Cail, of Paris, France, to take proper measures to recover such compensation or royalties as may be justly due to that company for the use of the invention secured to it by letters patent of the United States No. 301,220, granted July 1, 1884.

"The invention patented to the above-named company under the letters patent aforesaid is an 'improvement in breech-loading ordnance' invented by Charles T. M. V. de Bange, a retired colonel of the French army, the particular improvement in question being

well known to the ordnance officers of your department as the 'De Bange gas check.'

"The device in question performs a function indispensable in modern breech-loading ordnance—to wit, hermetically closing the breech against the escape of the gases of explosion, while at the same time not interfering with the expeditious withdrawal and insertion of the breechblock or plug.

"The De Bange gas check has, after thorough investigation and study of all devices and means designed to accomplish the same object, been approved by the ordnance officers and authorities of this Government. Experiments with and testing of the device was begun the same year the patent was granted, 1884 (see Report of Chief of Ordnance of the United States Army of that year), and continued for several years thereafter. Full detailed description and drawings of the device in question are found in the report for 1886, and the result of these studies and experiments has been that the great merit and superiority of the De Bange gas check has been acknowledged and the device adopted for all the guns and mortars of 6-inch caliber and upward made by or for this Government.

"Touching the value of the invention, we have made careful inquiries and examination; but as it is the desire of our clients to arrange terms with the Government of the United States which will justify and encourage the latter to adopt and use the invention in every piece of ordnance where its employment would be beneficial, and as they have authorized us to accept a royalty which will be at once recognized as a very small compensation for the known value of the device, it will be unnecessary to go into a discussion of this point.

"We have been authorized by our clients to grant licenses for the use of their said inventions at a rate of one per cent of the cost of the gun, it being recognized that the importance of the gas check increases with the calibre of the gun and the size of the charge it is designed to sustain.

"For the purpose of arriving at a uniform rate and of facilitating the completion of arrangements between the Government and the company to whom its letters patent have been granted, we have deemed it expedient to take a low average price and apply it to guns of all calibre. This uniform rate we would fix at $200 per gun. As the cost of these pieces is from $6,000 to $50,000 each, we think you will perceive at once that the patentee is desirous of making an arrangement advantageous to the Government, and which you will have no hesitation in assenting to.

"This proposition is submitted for the purpose and with the object of arriving at a speedy settlement, and of course does not represent the measure of value of the invention, which is now recognized in all the leading nations of the world.

"We presume that, following the usual course in such matters, you will, before finally acting upon this offer, take steps to inform yourself touching the matters herein presented by referring to the officers of the Ordnance Bureau. We beg to be advised of your action in

the premises, and in case you should see fit to refer this proposition to a board of officers for report and advice we will take pleasure in appearing before it and answering any questions that may be asked. We would beg to be notified of the time and place in case our presence for such purpose be desired or permitted.

"We have the honor to be, with great respect, your obedient servants,

"POLLOK & MAURO."

45

NAVY DEPARTMENT,
Washington, February 10, 1894.

GENTLEMEN: Referring to your communication of the 31st ultimo, in which as counsel for the Société Anonyme des Anciens Établissements Cail, of Paris, France, you invite the department's attention to the question of the use of the gas check invented by Charles T. W. V. de Bange, a colonel in the French navy, and state that you are authorized by your clients to grant certain licenses, I have to inform you that the question of Colonel de Bange's claim was referred by the honorable the Secretary of State to this department under date of August 20, 1891, and in the consideration of the matter which then ensued the Bureau of Ordnance made the following statement:

"The gas check which has been adopted for the naval guns of 6-inch calibre and upwards resembles in certain features that described in United States Patent No. 301,220, issued to Colonel de Bange. It also differs from it materially in particulars which are original in this bureau."

I enclose herewith, for your information a copy of the letter addressed to the Secretary of State by this department, under date of September 3, 1891, conveying its decision in regard to the matter before it.

As the status of the case has not changed since the date of the department's letter above mentioned, and as the matter has been previously disposed of by the department, no further consideration of the case appears to be required.

Very respectfully,

(Sgd.) H. A. HERBERT,
Secretary of the Navy.

MESSRS. POLLOK & MAURO,
620 F street, N. W., Washington, D. C.

Claimant's communication of January 31, 1894, to the Secretary of the Navy was the subject of a report and recommendation by the then Chief of Ordnance, Admiral W. T. Sampson, as follows:

46 "No. 2043.]

"BUREAU OF ORDNANCE, *December 4, 1894.*

"Respectfully returned to the department.

"The gas check applied to guns constructed for the navy is that illustrated in United States Letters Patent No. 318,093, of May 10,

1885, and so far as this patent is valid no royalties should be paid. (See Court of Claims Reports, p. 334, vol. 23, 1887–88.) If, however, as the bureau believes to be the case, the above-mentioned patent is only valid so far as it covers improvements on the De Bange patent (No. 301,220, of July 1, 1884), then, so far as the latter patent is valid, the within claim for royalties, in the bureau's opinion, is a proper one, and would be maintained by the courts.

"It must be noted, however, that until recently there has been no authority of law for the payment of royalties out of the naval appropriations, and the manufacture of most of the gas checks in question had been completed prior to the legislation giving such authority. Moreover, the bureau is of opinion that the Davis patent (No. 318,093, of May 19, 1885) covers real and important improvements, without which it is doubtful if the De Bange system would have been adopted for United States naval guns, and consequently it will be necessary to decide as to the relative values of the device in its original and improved forms. The fact that practically the same gas check is in use in all United States Army guns of recent construction, and is being applied to guns now being made by the Bethlehem Iron Company, under contract with the War Department, should also be considered, since independent action on the part of the Navy Department might easily be against the interests of the Government.

"It is therefore recommended that an investigation be made in regard to the De Bange patent, and if this patent is concluded to be valid that the War Department be consulted as to whether a definite sum, to be fixed upon either by a board or in some other way, should not be offered the claimants for the right on the part of the Government to use the device in question on all its guns.

"W. T. SAMPSON,
"*Chief of Bureau of Ordnance.*"

The final action of the Navy Department upon petitioner's claim was communicated to the petitioner in a letter of the Secretary of the Navy, dated December 31, 1894, as follows:

"NAVY DEPARTMENT,
"*Washington, December 31, 1894.*

"GENTLEMEN: The department has carefully considered the questions presented in the brief filed by you, as well as in former correspondence, relative to the matter of the claim of the Société Anonyme des Anciens Établissements Cail for compensation for the use by the United States of a gas check invented by Col. Charles T. W. V. de Bange, of the French army.

"It appears that the matter is now in such a condition that it will in all probability involve not only questions arising under the patent issued to Colonel de Bange, but also those growing out of the claims and affecting the rights of other patentees. Under these circumstances the department is of opinion that the full consideration and determination of these questions can be more certainly and equitably

reached and the rights of all the parties concerned, as well as the Government, more definitely ascertained and assured through the medium of a court of justice. It is therefore suggested that the necessary proceedings for the consideration and adjustment of the matter by the Court of Claims be instituted.

"Very respectfully,

"H. A. HERBERT, *Secretary.*

"MESSRS. POLLOK & MAURO,
"*Attorneys at Law, Washington, D. C.*"

The final action of the War Department was communicated to claimant's attorneys in a letter dated January 14, 1895, in which the language and suggestion of the Secretary of the Navy were adopted substantially verbatim:

47

IX.

"UNITED STATES PATENT OFFICE.

"JAMES B. DAVIS, OF WASHINGTON, DISTRICT OF COLUMBIA.

"*Gas check for ordnance.*

"Specification forming part of Letters Patent No. 318,093, dated May 19, 1885.

"Application filed December 23, 1884. (No model.)

"*To all whom it may concern:*

"Be it known that I, James B. Davis, residing at Washington, in the District of Columbia, have invented certain new and useful improvements in gas checks for breech-loading ordnance, of which the following is a specification, reference being had therein to the accompanying drawings.

"This invention relates to gas checks for breech-loading ordnance, and it consists in certain improvements, as hereinafter set forth and claimed.

"The object of the invention is to produce a gas check which will operate perfectly to close the breech of a breech-loading cannon against gas escape, and which will not "set" in expanded position.

"Prior to my invention gas checks somewhat similar to mine had been used, but the rings were of soft metal, and it frequently became necessary to pass a rod into the gun from the muzzle in order to start the breech after firing.

"My invention is particularly intended as an improvement on Patent No. 301,220, of July 1, 1884.

"In the drawings, figure 1 is a longitudinal section of a portion of the breech plug of a gun with my gas check applied. Fig. 2 is

a face view of one of the gas rings. Fig. 3 is a view of the gas check in position in the breech of a gun.

"A indicates the breech plug, which is usually provided with a mutilated screw thread to secure it in the breech of the gun A^2.

" B is the so-called " mushroom," the head *b* forming the front of the breech plug. The stem *b'* of the mushroom is screw-threaded, and lock nuts C C' on said stem bear against the spring D, which rests against the shoulder *a'* in the plug, serving to draw the mushroom toward the rear of the plug with a spring pressure.

" E E' are steel plates having central holes, *e*, for the passage of the mushroom stem, and being concaved between the central stem and the outer edges. The edges *f f'* of the plates E E' are brought nearly to knife edges. The periphery of each plate is a cylinder which will just enter its seat in the gun. In the annular space between the plates E E' there is a bag or cushion, K, preferably of canvas, said bag being filled with a slightly compressible fibrous material, as asbestos and tallow. The plates E E' and the packing between them can be removed by unscrewing the nuts and removing the mushroom.

" I find it more convenient in manufacture to make the rings E E' separate from the plug and mushroom than to turn them up solid with those parts.

" When a gun having this gas check in position is fired, the backward pressure of the powder gas on the mushroom expands the bag and its filling radially, which also expands the knife edges of the rings at *f f'*, making a tight joint.

"A compound plate of brass and tin or brass and copper has been used in the location of one of my plates E E', but said plate differed from mine in material, in structure, and in function.

" I claim—

" 1. In combination with the breech plug and mushroom head, a pair of steel rings surrounding the stem of said head, said rings have annular concave spaces in their proximate faces, and a textile bag filled with fibrous material between said plates, substantially as described.

" 2. The combination, with the breech plug of a heavy gun, of a mushroom head secured thereto by nuts on the mushroom spindle, a spring pressing the mushroom backward, a pair of steel rings, E E', between the head and plug, and an elastic cushion between the steel rings, all substantially as shown and described.

" In testimony whereof I affix my signature in presence of two witnesses.

" JAMES B. DAVIS.

" Witnesses:
" W. A. BARTLETT,
" J. HARRY STUART."

(No Model.)

J. B. DAVIS.

GAS CHECK FOR ORDNANCE.

No. 318,093. Patented May 19, 1885.

Fig. 1.

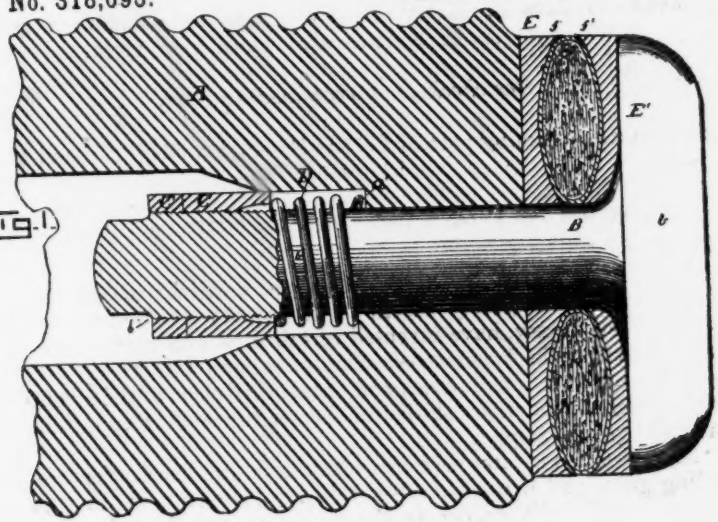


Fig 2.

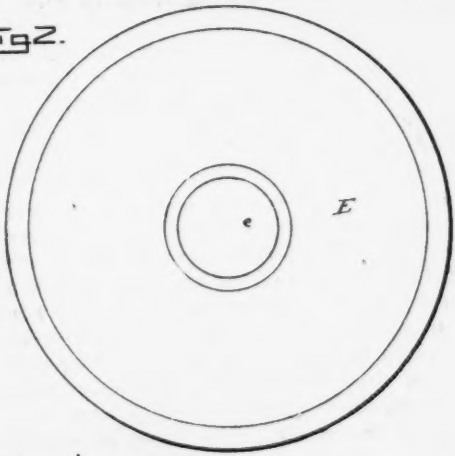
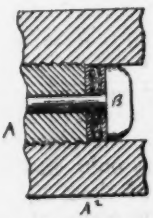


Fig 3.



WITNESSES:

Storrs R. Clark

J Harry Stuart

INVENTOR.

James B. Davis.

By W. A. Bartlett

His atty.

49

X.

" UNITED STATES PATENT OFFICE.

" GREGORY GERDOM, OF SANDY HOOK, NEW JERSEY, ASSIGNOR OF ONE-HALF TO JOHN H. REYNOLDS, OF TROY, NEW YORK.

" *Gas check for breech-loading guns.*

" Specification forming part of Letters Patent No. 539,733, dated May 21, 1895.

"Application filed March 6, 1895. Serial No. 540733. (No model.)

" *To all whom it may concern:*

" Be it known that I, Gregory Gerdom, a citizen of the United States, residing at Sandy Hook, in the county of Monmouth and State of New Jersey, have invented certain new and useful improvements in gas checks for breech-loading guns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

" My invention relates to improvements in gas checks for breech-loading guns, and it consists of certain improvements in the type of gas check ordinarily known as the de Bange gas check in which a plastic pad made mostly of asbestos is used.

" The object of the invention is to produce a gas check which will operate efficiently to close the breech of a breech-loading gun against the escape of the gases formed by the explosive, and which will permit the free and easy movement in out of the breech plug. Prior to my invention certain gas checks have been used for this purpose in which the plastic pad was contained between two metal disks with their lips on their circumference, which were expanded outward against the bore of the gun due to the compressive action of the powder gas on the plastic pad. These lips being bound to the circular disks were only elastic on their edges and the repeated expansion outward of these lips caused them to take a 'set' and bind hard against the walls of the gun so that the withdrawal of the breech-block after firing was made with the greatest difficulty. This made the diameter of the lips larger than was designed so that they frequently had to be turned down to the required size. Again, to facilitate the easy withdrawal of the breechblock after firing, the seat on the walls of the gun on which the lips of the metallic disks bear was made conical, the diameter in the rear being larger than the diameter in front. This required that the rear metallic disk be larger in diameter than the front one and that their circumferences should also be made conical. As the limit of expansion of the small lips was very small, the diameter of the disks had to be made very nearly the diameters of the seats for the lips in order that the lips might expand out to the seat to form a close joint. Certain difficulties in

manufacture prevented the accomplishment of the proper fit. Again, if the pads varied in thickness, the clearance between the front disk and the walls of the gun also varied and might be sufficient to permit the gas to pass the front disk and penetrate the pad. It was to remedy these and other defects that the hereinafter described improvements were made.

"Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

"Figure 1 represents a central longitudinal section through the powder chamber of a gun, showing the gas check in the position it would assume before the gun is fired. Fig. 2 represents a front view of one of the split rings used in the gas check, and fig. 3 represents a transverse section of the same. Figs. 4 and 5 represent views similar to figs. 2 and 3 of another one of these split rings used on the exterior of the plastic pad; and figs. 6 and 7 represent a similar view of the smaller ring, which is mounted on the spindle of the mushroom head and prevents the exuding of matter from the plastic pad through the center of the breechblock.

50 "A represents the body of the gun which is provided with a powder chamber A′, and the ordinary slotted chamber A^2 for the interrupted-screw breechblock B. The breechblock is provided with a cylindrical chamber B′ for the enlarged portion C′ of the stem, to which the mushroom head C is secured. The shank C^2 of said stem passes to the rear in the breechblock in the well-known way. This enlarged portion C′ of the stem is curved outward as at c', and terminates in a cylindrical shoulder c as shown in fig. 1.

"An annular plate or washer D fits against the face of the breech plug B^2, and fits loosely over the stem C′ and also loosely in the powder chamber A′. This washer D has an annular recess terminated by the shoulder d cut in its front face to receive the split ring F, which has a clearance between it and the said shoulder of about two-hundredths of an inch, and thus allows the said split ring to be sprung inward as the breechblock is forced forward in the powder chamber. The said ring is made somewhat larger than the interior of the powder chamber, and has to be sprung into position. The small split ring H incloses the stem and prevents the exuding of the materials of the pad into the chamber B′. Forward of the rings F and H and the washer D, is the plastic pad E made of asbestos and tallow, as in the de Bange system of gas checks, and covered with canvas e. Outside of this pad, the ring K is put around the inner face of the mushroom head C. This ring K is made somewhat larger than the interior of the powder chamber, and has a clearance of two-hundredths of an inch from the shoulder c, so that the said ring may be sprung inward as the breech plug is forced forward in the powder chamber. These two rings F and K are split as at f and k and are curved as at f' and k', respectively, as shown most clearly in figs. 2 and 5.

"When the gun is fired the gas, acting on the mushroom head, forces it backward, compressing the plastic pad E and causing it, by means of curve c' of the spindle, to expand radially against the walls of the gun, carrying with it the highly elastic split rings and, together with the rings, forming a gas-tight joint where they bear hard against the seat.

"The diameter of the split rings is slightly larger than the diameter of the seat, so that they should always be in contact, but in case they were not, their high capability for expanding circumferentially and also radially, due to their being split, would easily enable them to be expanded for a considerable distance by the plastic pad until they come in contact with their seat.

"After the discharge of the gun the various parts assume their normal position and allow the breechblock to be opened with the ease with which it was closed before firing.

"The rings are highly elastic by reason of their being split, so that they are easily expanded and easily contracted after the pressure which expanded them has been removed. Their being of a larger diameter than their seats, they are always in contact with the said seats, and consequently always protect the edges of the pad, preventing their being destroyed by the gas and also preventing any exudation of the plastic material of which the pad is composed. At the same time being expanded by the great pressure due to the expansion of the plastic material they form with the pad a gas tight joint where they are in contact with the walls of the gun. Another important point is that by splitting the rings they will compress as well as expand. It is thus possible to make them, in their natural state from one one-hundredth to two one-hundredths of an inch larger in diameter than the diameter of the seat, so that when the breech block is forced into the gun they bear against the walls of the gun for some distance before they reach their seat and scrape off any residue or fouling that may have been left there, leaving a clean smooth surface for them to bear against under pressure, thus better insuring a perfect joint. Again, on account of their being larger in diameter than their seat, and on account of their great expansibility the coning of the gas check seats need not be made to such fine dimensions, thus reducing cost. On account of the rings being split they are capable of being compressed as well as expanded and consequently they do not bear hard against the walls of the gun after the pressure has been removed, allowing the breech block to be opened easily. Furthermore, the split rings being of same thickness and being beveled to correspond with the coning of gas check seat have quite a considerable bearing area on the walls of the gun and consequently do not indent it or score it as a thin lip would do when its thin edge is in contact. The split in the rings with the pad forms a gas check in itself so that no gas can pass through the split and get into the pad. These and the various other advantages of the herein described construction would readily suggest themselves to anyone skilled in the art.

"Having thus described my invention, what I claim, and desire to secure by letters patent of the United States, is—

"1. The combination in a gun, of a breech block provided with a recess in the face thereof, a movable head projecting in front of said breech block and provided with a stem entering said recess, a
51 washer in front of said breech block and loosely encircling said stem, a small split ring around said stem in front of said washer and closely engaging said stem, a plastic pad included between said washer and said movable head, and two resilient split rings, made of greater diameter than the powder chamber and mounted one at either side of the outer edge of said pad, substantially as and for the purposes described.

"2. The combination in a gun, of a breech block provided with a recess in the face thereof, a movable mushroom head C curved on its rear face as at c', and shouldered as at c, and having a stem projecting into said recess of the breech block, a washer in front of said breech block and loosely encircling said stem, a small split ring around said stem in front of said washer and closely engaging said stem, a plastic pad included between said washer and said movable head, a resilient split ring K curved as at k' made of greater diameter than the powder chamber and mounted exterior to said shoulder c and forward of said pad, and a ring curved as at f' mounted in front of said washer and in rear of said pad, substantially as and for the purposes described.

"3. The combination in a gun, of a breech block provided with a recess in the face thereof, a movable mushroom head C curved on its rear face as at c', and shouldered as at c, and having a stem projecting into said recess of the breech block, a washer in front of said breech block and loosely encircling said stem and shouldered as at d, a small split ring around said stem in front of said washer and closely engaging said stem, a plastic pad included between said washer and said movable head, a resilient split ring K curved as at k' made of greater diameter than the powder chamber and mounted exterior to said shoulder c and forward of said pad, and a resilient ring F split as at f and curved as at f', made of greater diameter than the powder chamber and mounted exterior to said shoulder d and in rear of said pad, substantially as and for the purposes described.

"In testimony whereof I affix my signature in presence of two witnesses.

"GREGORY GERDOM.

"Witnesses:
"CARL F. JEANSEN,
"GREGORY GERDOM, Jr."

(No Model.)

G. GERDOM.

GAS CHECK FOR BREECH LOADING GUNS.

No. 539,733. Patented May 21, 1895.

FIG. 1.

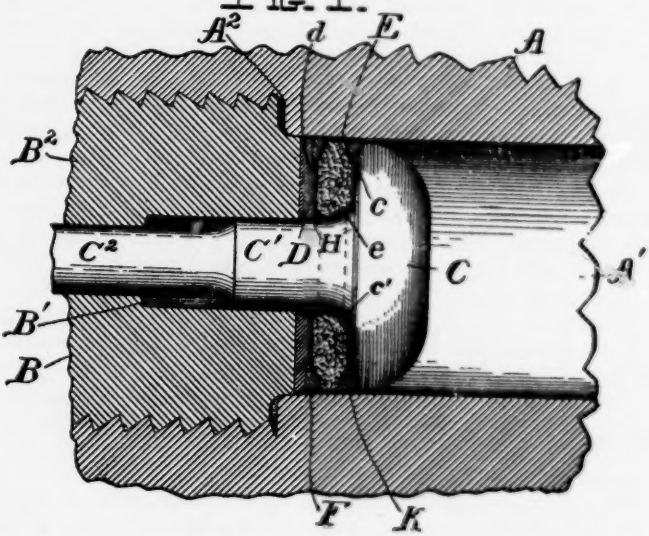


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FIG. 2.

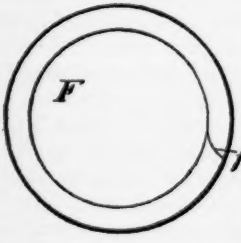

FIG. 3.

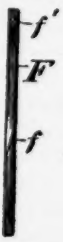

FIG. 4.

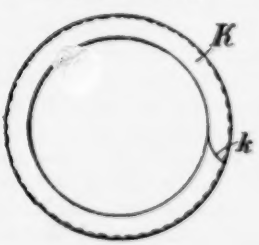

FIG. 5.

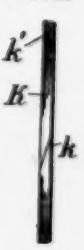

FIG. 6.

FIG. 7.

Witnesses
Roy C. Bowen,

Inventor
Gregory Gerdom,
By Whitman & Williamson
Attorneys.

All the plastic pad obturators, known as "de Bange gas checks" employed by the Government of the United States, were provided with yielding pads of asbestos and tallow inclosed in a canvas envelope and protected by steel rings (instead of a copper envelope and brass shells), and contained the other elements of claim 1 of claimant's patent, to wit, the partially threaded plug B, headed pin N N′, extending through said plug, (the said yielding pad of asbestos and tallow with its fittings being arranged between head N′ and the inner end of the plug) in combination with each other and with the gun A arranged as shown to allow the pin to be driven rearward and compress the packing. Some of the said plastic pad obturators so used by the defendant followed substantially the construction described in the foregoing Davis patent, but the greater number followed substantially the construction described in the foregoing Gerdom patent. Said plastic pad obturators have been used by the Government of the United States between July 1, 1884, and July 1, 1901 (the term of the patent), as follows:

In guns made for the Navy:

4	4-inch	
2	5-inch	
133	6-inch	
81	8-inch	
25	10-inch	
16	12-inch	
34	13-inch	
		295

In guns made for the Army:

362	3″ .2 rifles.	
25	3″ .6 "	
44	5″ siege rifles.	
61	7″ " mortars.	
41	7″ " howitzers.	
94	8″ rifles.	
127	10″ "	
115	12″ "	
354	12″ mortars.	
		1,223
Total		1,518

53 CONCLUSION OF LAW.

Upon the foregoing findings of fact the court decides as a conclusion of law that the claimant recover of and from the United States the sum of one hundred and thirty-six thousand dollars ($136,000).

BY THE COURT.

54 *VI. Opinion of the court.*

BOOTH, J., delivered the opinion of the court:

This is a suit for the recovery of royalties alleged to be due the claimant because of the use of the defendents of a certain patented invention, the patent in issue being a gas check or obturator, a device

indispensable to the effective operation of breech-loading cannon. Defendant concedes the use of such a mechanism, but disclaims the use of claimant's device by attacking the scope of the patent.

A defense going to the jurisdiction of the court is raised. We think the question is settled by the case of United States v. Berdan Fire Arms Co. (156 U. S., 552). The findings disclose an invitation to present the details of the patent to the defendant, its examination by a board of officers appointed to investigate such inventions, and its final use without the slightest claim of ownership. Nothing appears to show an intention to dispute claimant's title to the patent, hence an implied contract arose to pay for such use.

The material issue involved is the precise limit or scope of claimant's patent as appears from specifications and claim 1 of his letters No. 301,220.

From a careful examination of the language of the claim and specifications of the patent in suit, it is obvious that the same is susceptible of two constructions. This is likewise apparent from the history of the patent in the Patent Office, from which it appears numerous amendments were required of the claim before final allowance was granted. Claimant's contention is predicated upon such a construction of claim 1 as limits the real patent to a "yielding packing ring of asbestos and tallow," defendants asserting that the language of the claim expressly describes the patent of a device composed not only of a yielding packing ring of asbestos and tallow, but also includes the employment of the other elements described in the claim, which constitute an integral part thereof and are inseparable therefrom.

The state of the art at the time of the granting of patent No. 301,220 clearly indicates the novelty of the De Bange patent. Many breech-loading devices as applied to firearms had been previously patented, several of which had been more or less satisfactory, and used considerably. It is indisputable, however, that until the advent of the De Bange patent the development of the art had brought forth but two breech-loading mechanisms universally recognized and employed by the nations of the world in the use of their offensive armament, viz, the Krupp or sliding-wedge system, and the interrupted screw or French system. The De Bange patent was applied wholly and exclusively to the interrupted screw or French system of fermeture. The obstacle, which had in each instance forestalled the successful and effective operation of each breech-loading mechanism preceding the De Bange patent, had been the failure to discover an effective system of obturation. In the discharge of a projectile from large cannon there is instantaneously generated a large quantity of poisonous gases, which, under the tremendous pressure of 35,000 pounds to the square inch, seek instant escape toward the rear as well as the muzzle of the gun. If permitted to come in contact with the breech-loading mechanism attached to the rear of the gun, they engender a system of erosion fatal to the life of the mechanism itself. For many years the inventive genius of those skilled in the

use and science of firearms concerned themselves in an effort to discover some device, some process, by which the escape of gases generated by the explosion of the projectile could be checked in their efforts to escape to the rear of the gun. To accomplish the result, some element or combination of elements must possess the inherent qualities of being capable of instantly receiving laterally the tremendous pressure of the gases, expanding with equal alertness axially, so as to close effectually the joints of the breech-loading mechanism, and then speedily resume its normal shape, so as not to retard the reloading of the cannon.

55 In January, 1867, Antoine Alphonse Chassepot, of Paris, France, invented and patented an obturating device, which when applied to small firearms was an eminent success, but proved a failure in its application to field guns and cannon of large caliber. The functioning element of the Chassepot obturator was a "cylindrical disk or tube of vulcanized india rubber." In 1868 Colonel Olry attempted obturation by cups of pasteboard inserted so as to cover the head of the cartridge. His invention effected obturation, but encountered such difficulty in extracting the device from the cannon after the discharge that it was abandoned. The Elswick cup and the Broadwell ring checks had been in successful use in connection with the slotted screw breech plug; but not as to the interrupted screw system of fermeture. In 1872 Captain de Bange, an officer of the French army, began a series of experiments looking toward the perfection, among other things, of an obturating device. Soap, molded leather, a mixture of talc and tallow and soap with a base of lime were successively tried to supply the indispensable element of yielding packing obturator, but all to no avail. Finally, and as a result of his experiments, he combined a mixture of asbestos and tallow, formulated it under great pressure in the shape of a ring, and applied it to the interrupted screw or French system of fermeture, as set forth in his patent. It is therefore almost inconceivable how the court can, in view of the state of the art prior to the De Bange patent, arrive at any other conclusion than that the De Bange invention was, in fact and in substance, a discovery of a distinct, new, and novel system of obturation. No system of obturation prior to it had anticipated the use of a yielding packing ring of asbestos and tallow; repeated attempts at a substitute had failed, and the findings disclose its successful use and operation ever since. Was this invention patented by Letters Patent No. 301,220?

The language of the specification in its introductory part says: "I have devised a system of packing placed in advance of the plug, and which is expanded by the force of the explosion of the powder to make a tight joint to prevent the leakage of gas;" then follows in detail the construction and operation of the device. Claim 1 is drawn with the same preciseness, and, in conjunction with the claim 3, covers in toto the details of the patent. The specifications and claim being addressed to those skilled in this particular art or science, only such

precision and nicety was required as to enable such a class of persons to use the invention. (Loom Co. v. Higgins, 105 U. S., 580.) It is difficult to perceive how one skilled in the particular art or science of breech-loading ordnance could fail to instantly avail himself of the essential, the functioning, the indispensable element of the device described in the specifications and claim, to wit, "the ring of asbestos and tallow." Every description of the patent in either the specifications or claim imports in terms the predomination of the one central idea of a yielding packing composed of asbestos and tallow. It is the invention; without its presence the device fails, with it the device succeeds. The details of construction are of minor importance. Shall De Bange be denied the character of inventor because, subsequent to his patent, the yielding ring of asbestos and tallow is incased in canvas instead of copper; because split steel rings instead of brass are forced by the expansive quality of the pad to perform exactly the same functions? Much expert testimony has been adduced to aid the court in the construction of this patent. It is of the usual contradictory character and wholly irreconcilable; but throughout it all it nowhere appears that any device subsequent to the De Bange patent has ever been used by the defendant that did not appropriate and embody the use of a ring of asbestos and tallow. The court is of the opinion that the invention described by the language of the claim was the yielding pad of asbestos and tallow. The nonessential details of construction found in the specifications and claim for a patent should not be allowed to obscure the real invention, if it can be validated, without doing violence to the language thereof. In Whipple v. Middlesex Co. (Fish Pat. case) the court said:

"If, by examination of the specifications, and applying to it the then state of the art, we can learn what the invention was, then the claim, which was designed to be a condensed summary of the invention, is to be construed so as to be coextensive with the invention, if that can be done without doing violence to the language."

In Consolidated Fastener Co. v. Columbia Co. (79 Fed. R., 795) the court said:

"That the patent is susceptible of the latter construction must be admitted. Many plausible reasons can be advanced to sustain such a construction. On the other hand, an equally cogent argument can be advanced in favor of the former construction. Confining the discussion to the language of the patent, it is manifest that where two interpretations are possible that one should be chosen which upholds the patent. If the defendant's contention be upheld, the patent ceases to be protection. The essential feature is strangled by a useless and nonessential feature."

A multiplicity of cases too numerous for citation, extending over the entire subject of construction of patents, have placed the
56 courts in the attitude of extending to inventors the protection of the patent laws of the country when the real invention is capable of ascertainment and it distinctly appears from the letters patent that the inventor has contributed to the art a useful and valu-

able invention. The rule of ut res magis raleat quam pereat is almost universally applied rather than deprive an inventor of the fruits of his industry by technical construction. (McCormick v. Talcott et al., 20 How., 402; Turrill v. Railroad Co., 1 Wall., 491; Corning v. Burden, 15 How., 268; Van Master v. Miller, 15 Blatch., 562; Winans v. Denmead, 15 How., 330.)

It is urged with much persistency that the rejection of the claim as first specified, by the Patent Office, precludes a claim for a patent covering a distinct species of packing. It is to be observed in this connection that the claimant did not introduce into his amended claim any new element or eliminate any old one.

Claim 1, the only claim in issue in this proceeding, remained substantially the same. It is not pretended that the language thereof as first specified or subsequently amended was materially changed. There was absolutely no proviso or limitation as applied to the yielding packing engrafted into this claim at any stage of the proceedings. The yielding packing was designated by the letter "M" in claim 1 when originally presented to the Patent Office. This description of the real invention continued to be employed throughout the entire proceedings, and finding 1 discloses that it is now the same. To hold otherwise, claim 3, a detail of construction, containing nonessential elements, must be read into claim 1. Both claim 1 and claim 3 construed together indicate an identity of invention, claim 1 being a specification of the real patent and claim 3 a specification of construction and utilization. If such narrow limitations can be imposed upon claim 1 of the De Bange patent as to restrict the patent to a yielding pad of asbestos and tallow, almost totally enveloped in the elastic shells of copper and placed between rigid shells of brass, serving as specified therein, then subsequent inventors can with impunity appropriate the essential element of any device, universally recognized as effective and useful, a distinct and important advance in the art, the indispensable and functioning feature of all its successors, it being conceded in the defendants' brief that Captain de Bange was the first to use a ring of asbestos and tallow.

Patent No. 318,093 of James B. Davis is expressly stated to be an improvement on patent No. 301,220 (the De Bange patent). The improvement consisted of the introduction of steel plates, the edges of the same being brought nearly to the thinness of a knife edge. The pad of asbestos and tallow is retained, although encased in canvas. The device was not a pronounced success and its use not employed. May 21, 1895, Letters Patent No. 539,733 were issued to Gregory Gerdom covering an improvement as stated in the specifications "to the type of gas check ordinarily known as the De Bange gas check, in which a plastic pad made mostly of asbestos is used." The differentiating feature of the Gerdom patent was the use of a split steel ring slightly larger than the inner circumference of the cannon instead of the brass ring specified in claim 3 of the De Bange patent. The pad of asbestos and tallow was employed by Gerdom, and with the exception of the split steel ring substantially as specified by De Bange.

The specifications for the Gerdom patent disclose a device, the operation of which depends upon the expansion of the pad of asbestos and tallow. "When the gun is fired the gas acting on the mushroom head forces it backward, compressing the plastic pad E and causing it, by means of curve C of the spindle, to expand radially against the walls of the gun carrying with it the highly elastic split rings forming a gas-tight joint where they bear hard against the seat." (Finding IX.) The detail description of the De Bange patent forwarded by Lieutenant Chadwick in his letter of April 27, 1883 (Finding III), specifies a canvas covering for the pad of asbestos and tallow, and likewise shows the employment of split rings. The detail of construction as found in this letter and the specifications of the Gerdom patent are strikingly similar, save in the substitution of steel for brass. De Bange treated the detail of construction as nonessential. The record discloses that in all subsequent inventions the pad of asbestos and tallow is the functioning element of the device, without which its utility is as nothing. The necessary expansion, indispensable to forward the operation of both the Davis and Gerdom patents, is supplied by the De Bange pad of asbestos and tallow. The defendants used the Gerdom improvement and paid the patentee substantial royalties therefor. That it was an improvement of value is not disputed; but it was only an improvement and did not supplant the De Bange patent as specified and claimed for in letters 301,220.

There is no testimony in the record upon which the quantum of damages can be predicated. The measure of damages would be the value of the device to the defendants. Following the precedents heretofore established, the case will stand upon the docket, with leave to furnish testimony upon this point.

Filed December 2, 1907.

BY THE COURT.

57 *VII. Judgment of the court.*

SOCIETE ANONYME DES ANCIENS Etablissements Cail *vs.* THE UNITED STATES.	No. 18796.

At a Court of Claims held in the city of Washington on the 20th day of May, 1909, judgment was ordered to be entered as follows:

The court, upon due consideration of the premises, find in favor of the claimant, and do order, adjudge, and decree that the said Societe Anonyme des Anciens Etablissements Cail do have and recover of and from the United States the sum of one hundred and thirty-six thousand dollars ($136,000).

BY THE COURT.

58 *VIII. Order of court. Filed October 25, 1909.*

SOCIETE ANONYME DES ANCIENS Etablissements Cail *vs.* THE UNITED STATES. } No. 18796.

Order: The claimant's motion filed June 8, 1909, and the defendants' motion filed June 10, 1909, for an amendment of the findings are overruled in part and allowed in part. The former findings of fact are withdrawn and amended findings of fact are this day filed. The judgment of the court and opinion to stand.

BY THE COURT.

Filed October 25, 1909.

59 *IX. Application of defendants for, and allowance of, appeal.*

In the Court of Claims of the United States.

SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS Cail *vs.* THE UNITED STATES. } No. 18796.

From the judgment rendered in the above-entitled cause on the 25th day of October, 1909, in favor of claimant, the defendants, by their Attorney-General, on the 14th day of December, 1909, make application for, and give notice of, an appeal to the Supreme Court of the United States.

JOHN Q. THOMPSON,
Assistant Attorney-General.

Filed December 14, 1909.

On the 27th day of January, 1910, it was ordered that this appeal be allowed as prayed for.

BY THE COURT.

60 *X. Application of claimant for, and allowance of, its cross appeal.*

In the Court of Claims of the United States.

SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS Cail *vs.* THE UNITED STATES. } No. 18796.

From the judgment rendered in the above-entitled cause on the 25th day of October, 1909, in favor of the claimant, the claimant, by

its counsel, Philip Mauro and Timothy D. Merwin, on this 20th day of January, 1910, hereby makes application for and gives notice of its cross appeal to the Supreme Court of the United States.

SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS CAIL,
By PHILIP MAURO,
TIMOTHY D. MERWIN,
Its Counsel.

Filed January 21, 1910.

On the 27th day of January, 1910, it was ordered that this cross appeal be allowed as prayed for.

BY THE COURT.

61 In the Court of Claims of the United States.

SOCIETE ANONYME DES ANCIENS Etablissements Cail *vs.* THE UNITED STATES.	No. 18796.

I, John Randolph, assistant clerk of the Court of Claims, certify that the foregoing are true transcripts of the pleadings in the above-entitled cause, of the findings of fact, conclusion of law, and opinion filed by the court, of the judgment of the court, of the order of court filed October 25, 1909, of the application of defendants for, and allowance of, appeal to the Supreme Court of the United States of the application of claimant for, and allowance of, cross appeal to said Supreme Court.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court of Claims, at Washington City, this 14th day of February, A. D. 1910.

[SEAL.]

JOHN RANDOLPH,
Assistant Clerk Court of Claims.

(Indorsement on cover:) File No. 22019. Court of Claims. Term No. 793. The United States, appellant, vs. Société Anonyme des Anciens Etablissements Cail. File No. 22020. Term No. 794. Société Anonyme des Anciens Etablissements Cail, appellant, vs. The United States. Filed February 15th, 1910. File Nos. 22019 and 22020.

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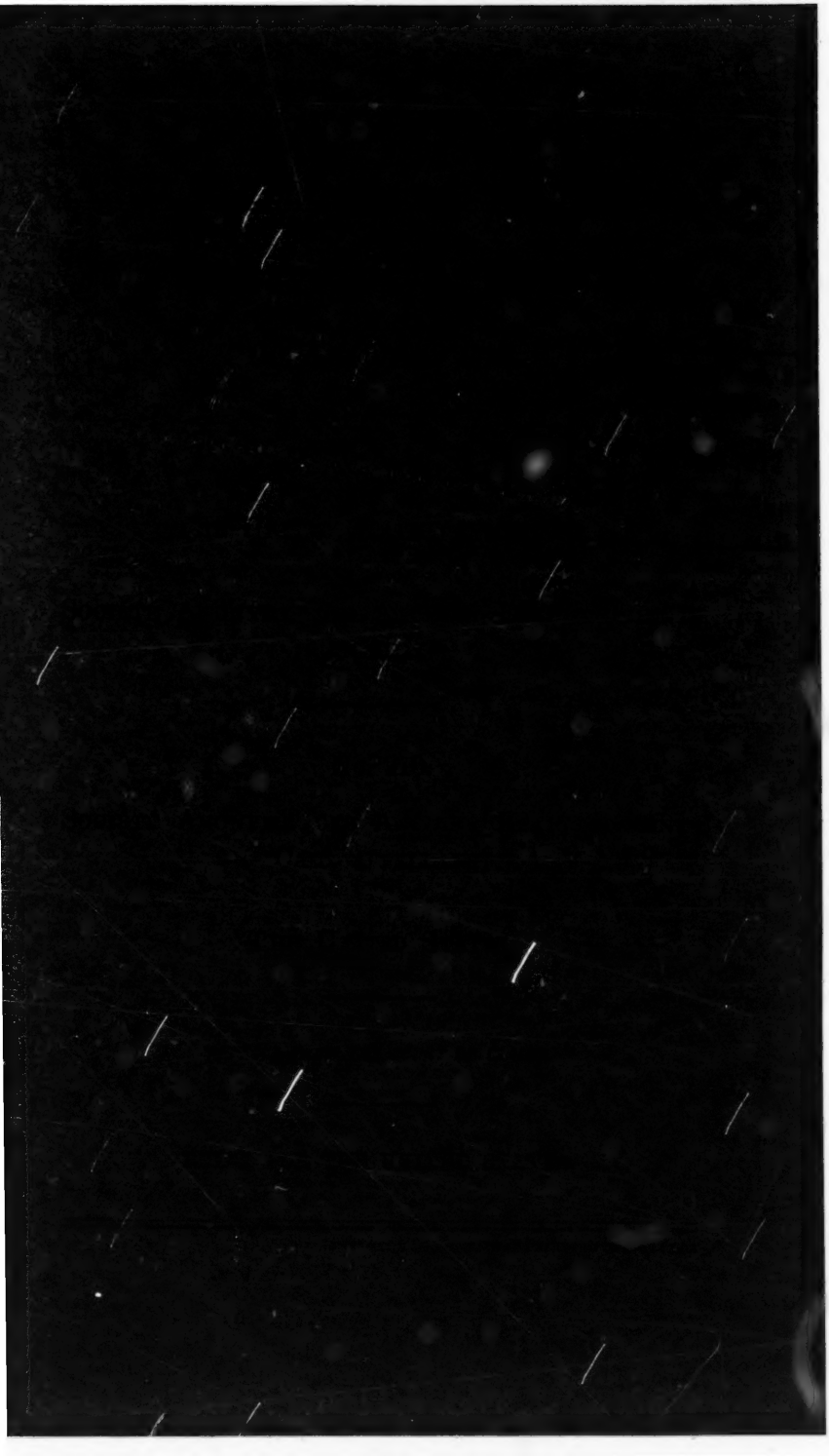

In the Supreme Court of the United States.

OCTOBER TERM, 1911.

THE UNITED STATES, APPELLANT,
v.
SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL. } No. 209.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, appellant,
v.
THE UNITED STATES. } No. 210.

APPEALS FROM THE COURT OF CLAIMS.

BRIEF ON BEHALF OF THE UNITED STATES.

STATEMENT.

The foregoing-named société is incorporated under and by virtue of the laws of the Republic of France.

This suit is for the recovery of royalties or damages alleged to be due because of the contention that the Government used a certain patented invention known as a "gas check" or "obturator," a device

applied to breech-loading cannon to prevent the escape of gas.

Much of the matter now embraced in the findings of fact was incorporated therein after the opinion of the Court of Claims was rendered and printed and as the result of motions made on behalf of the United States for amendment of the findings. The additions to the original findings are as follows:

First. Translation of article printed in Revue d'Artillerie, Volume XII, August 18, 1878, beginning at page 393. (Rec., pp. 21–28.)

Second. The paragraph (Rec., p. 28) immediately following the article above mentioned. Said paragraph reads as follows:

> Before the date of De Bange's invention, or the issuance of the patent in suit, there had been included in the use and operation of breech-loading guns the following elements and parts:
>
> A partially threaded plug, a headed pin extending through said plug, and a yielding packing arranged between the head of the pin and the inner end of the plug, in combination with each other and with a gun, to allow the pin to be driven rearward and compress the packing.

Third. Finding IV, from the beginning thereof, including the quotation of the publication on April 20, 1883, in Ordnance Notes No. 292 (Rec., p. 32 to near middle of p. 40), and the drawing accompanying and forming part of said Ordnance Notes No. 292 (Rec., p. 41).

Fourth. The correspondence between Col. De Bange and the officials of the United States, relative to the presentation of the claim here in question. (Rec., from near bottom p. 43 to middle p. 47.)

Fifth. The last paragraph of Finding V (Rec., p. 43).

Sixth. The paragraph from near top to middle (Rec., p. 61).

While it is insisted that upon the facts as originally found by the Court of Claims this court would not affirm the judgment based thereon, as to any of the points hereinafter assigned as error, yet in view of the new and material matter now incorporated in said findings by amendment, the opinion of the court below can not be correct in the light of the facts ultimately found.

On June 12, 1883, Charles T. M. V. De Bange, an officer in the French army, filed in the United States Patent Office an application for a patent for "improvement in breech-loading guns," together with an assignment of same to appellee, dated March 23, 1883 (Rec., p. 14). The subject matter of the device described and claimed in the application aforesaid was not patented abroad. The gas check designed by De Bange and commonly called the De Bange gas check, which consisted of a yielding pad or packing of asbestos and tallow inclosed in a cloth cover and held within tin cups and brass rings, was, however, well known and had been in public use abroad before the filing in this country of the application aforesaid. (Finding II, Rec.,

pp. 30–32; Finding IV, Rec., pp. 32–42.) After a number of actions on said application by the Patent Office, resulting in the cancellation, amendment, modification, or limitation of the original claims, a patent was issued to said company on July 1, 1884, containing four claims (Rec., p. 19).

Claim 1 "the only claim in issue in this proceeding" (Rec., p. 65), reads as follows:

> The partially threaded plug B, headed pin N N′, extending through said plug, and the yielding packing M, arranged between the head N′ and the inner end of the plug, in combination with each other and with the gun A, arranged as shown, to allow the pin to be driven rearward and compress the packing, as herein specified. (Rec., p. 19.)

On June 29, 1891 (Finding VI, Rec. pp. 43–47), *seven years* after the patent had been granted, De Bange took up the claim in question in this suit with the officials of the United States abroad, through whom it was promptly referred to the Navy Department, and said department examined into said claim and, by an official communication from the Secretary of the Navy, reported adversely thereon. The concluding paragraph of said communication reads as follows:

> In view of the statement made by the Chief of the Bureau of Ordnance, there appears to be *no proper ground* for the claim of Col. De Bange. (Rec., p. 47.) (Italics ours.)

The appellee, the assignee of De Bange, and the patentee of the patent in question, does not appear to have objected to the presentation of the claim by De Bange, nor did it present any claim in its own name until January 31, 1894, *nearly ten years* after the patent had issued. (Finding VIII, Rec., pp. 49–51). Whether De Bange, when he presented the claim in 1891, acted as the agent of the appellee, as was argued by its counsel in the lower court, is immaterial, since the subject matter of the claim presented was identical and in each instance was given consideration and rejected by the Navy Department. (Rec., pp. 46–47 and 51.) De Bange was so notified (Rec., pp. 46–47), and when the claim was again presented by the patentee, the appellee herein, the former action of the United States was referred to as being well founded and sufficient, and De Bange's assignee, appellee, was so notified in these words (Rec., p. 51):

> I inclose herewith, for your information, a copy of the letter addressed to the Secretary of State by this department, under date of September 3, 1891, conveying its *decision* in regard to the matter before it.
>
> *As the status of the case has not changed since the date of the department's letter above mentioned, and as the matter has been previously disposed of by the department, no further consideration of the case appears to be required.*

(Italics ours.)

The final action of the Navy Department rejecting the claim was communicated to the attorneys for appellee December 31, 1894. (Rec., p. 52.) Claimant's attorneys were notified of the action of the War Department January 14, 1895, in which communication the language and suggestion of the Secretary of the Navy were adopted substantially verbatim. (Rec., p. 53.) On January 31, 1895, the Société filed its petition in the Court of Claims. The case was argued and submitted October 22, 1907, and the original findings of fact and opinion were filed December 2, 1907. After hearing the motions for new trial and amendments of findings, the court entered the following order:

> The claimant's motion filed June 8, 1909, and the defendants' motion filed June 10, 1909, for an amendment of the findings are overruled in part and allowed in part. The former findings of fact are withdrawn and amended findings of fact are this day filed.
>
> The judgment of the court and opinion to stand.
>
> By the Court.
>
> Filed October 25, 1909.
>
> (Rec., p. 67.)

From this judgment the United States appeals.

On the 20th of January, 1910, the Société made its application for cross appeal, which was allowed January 27, 1910. (Rec., p. 67.)

ASSIGNMENT OF ERRORS.

The court erred:

First. In holding that the facts established by the correspondence between the parties presenting the claim and the duly authorized officials of the United States, relative to the request for compensation on account of the alleged use of the device here in question, are sufficient to constitute a proper basis for an *implied contract in fact,* as distinguished from an *implied contract in law.*

Second. In holding that it had jurisdiction of this cause, as of an *implied contract in fact,* arising out of the correspondence showing the relation of the parties hereto in connection with the claim in question.

Third. In failing and declining to hold that the facts disclosed by the correspondence between the parties hereto constituted *an infringement* or *tortious use* by the United States of the device alleged to be covered by claim 1 of the patent in suit.

Fourth. In holding that claim 1 of the patent in suit when construed broadly, as it was by the court below, was valid in view of the prior art.

Fifth. In holding that the structure of the device actually used by the United States was covered by claim 1 of the patent in suit, when said claim is properly construed as having been limited by the Patent Office to the combination of the particular elements therein recited or the mechanical equivalents thereof.

Sixth. In rendering judgment, in any amount whatever, against the United States in damages on account of its use of the device in question in this suit.

THE ISSUES.

The principal questions here for determination are:

1. Whether the acts of the parties as shown by the correspondence and facts set forth in the findings are such as to constitute an implied contract in fact, as distinguished from a tort, between the United States and appellee whereby the Government becomes liable in damages for the alleged use of appellee's patented device.

2. Whether the Government used the device as set forth in appellee's patent and defined in claim 1 thereof.

ARGUMENT.

FIRST, SECOND, AND THIRD ASSIGNMENTS OF ERROR.

The Court of Claims rests its decision as to the question of jurisdiction in this suit upon a single citation, namely, *United States* v. *Berdan Fire Arms Company* (156 U. S., 552), as though that case conclusively settled the questions of fact and law raised herein.

It is respectfully insisted, however, that the facts disclosed by this record are materially different from those of the Berdan case, and the ruling of this court in relation to that case should

not be regarded as settling the jurisdictional questions in the case at bar. In the Berdan case the patent in question was issued before the alleged use by the Government of the device began, and the existence of said patent was known at that time. This is not shown to be true in the case at bar. In the Berdan case the twenty-third finding of fact discloses that while Berdan's application for patent No. 88436 was pending, the Chief of Ordnance of the Army said, in substance, that if any of the features of that patent should be used by the defendant in the manufacture of the Springfield gun the officers expected to recommend the payment for such use when the claims had gone through the proper channels and were settled; that the inventor wrote to the Chief of Ordnance asking the assistance of the War Department in securing speedy action on the pending application in the Patent Office, which letter was transmitted by the Secretary of War to the Secretary of the Interior, stating that "the early consideration of the aforesaid claims is regarded as being desirable." By the same finding it appears that the device covered by this patent was exhibited in 1873, in competition with other guns, to a board of officers called the Terry Board, detailed to inspect guns, and that in the report of this board the device is fully described. That Gen. Benet became Chief of Ordnance in June, 1874; "that he understood the Springfield device for extracting

and ejecting the shell, as described in the 'Terry' report, as 'seemingly identical, certainly the mechanical equivalent' of Berdan's device for the same subject, covered by patent 88436;" and with this understanding continued the manufacture of the Springfield gun, containing the disputed ejector and extractor device, after adjournment of the Terry Board, with the expectation that if the court sustained the claim by Berdan against the Government upon his patent No. 88436, then the Government must pay him for the use of his invention.

In the Berdan case this court said that upon the facts the Government, "were it a private person, would be liable to an action of infringement," but that "a mere infringement, which is only a tort, creates no cause of action cognizable in the Court of Claims." This court ruled, however, in that case, "that the judgment of the Court of Claims was not founded upon a tort resulting from a mere infringement, but upon *a contract to which both parties assented.*" And the court also held that the import of the findings of the Court of Claims was:

> That the officers of the Government charged specially with the duty of superintending the manufacture of muskets regarded Berdan as the inventor of this extractor ejector; that the difference between the spiral and flat spring was an immaterial difference; that, therefore, they were using in the Springfield musket Berdan's inven-

> tion; that they used it with his permission, as well that of his assignee, the petitioner, *and that they used it with the understanding that the Government would pay for such use as for other private proverty which it might take,* and this, although they did not believe themselves to have the authority to agree upon the price.

(Italics ours.)

In the case at bar, the facts as shown by the record may be concisely stated as follows:

On March 22, 1883, De Bange, the alleged inventor of the patented device here in question, made a full and complete assignment of all his interest therein to the appellee. Before the date of the application for the patent or of the assignment thereof, the War Department issued on April 20, 1883, a publication known as Ordnance Notes No. 292 (Rec., pp. 32–40, and 41), which contained a full description of the De Bange gas check as known and used abroad. On April 27, 1883, Lieut. Commander Chadwick, by letter to the Navy Department, sent a description of the De Bange gas check as known and used abroad, and on July 5, 1883, Chadwick forwarded to the Navy Department a De Bange gas check or obturator which he stated was presented to him by the French minister of war (Rec., pp. 40 and 42). If the Chadwick letter be relevant at all, it only shows that the information furnished by De Bange did not relate to the identical type of gas check described in the patent in

suit, as at that date no application had been made for the patent. The letter of April 27, 1883, describes the De Bange gas check as actually known and used for some years previously, and repeatedly published to the world, but it gives no description of the *patented* gas check, of which Lieut. Commander Chadwick could have had no knowledge, since application for the patent was not made until June 12, 1883, more than six weeks after the letter was written. Even De Bange's oath to the application for patent (Rec., p. 19) was made a month later than the date of Chadwick's letter, and the letter does not contain the slightest intimation that De Bange had told Chadwick anything about his intention to apply for a patent, or the type of gas check which his application would cover. All that the letter shows is that De Bange informed Chadwick of the particular way in which he made the different *expansible portions* of his *unpatented* gas check, the actual form of which was already well known in the ordnance world. The model of the De Bange gas check which Chadwick received from the French minister of war and transmitted to the Navy Department with his letter of July 5, 1883, was presumably made in accordance with the description of the method of constructing said type of unpatented gas check which is found in his letter of April 27, 1883. It will be noted that Chadwick stated in his letter of July 5, 1883, that he received the model from the French minister of war, and

he does not state that it came from De Bange nor from the appellee company. But even if Chadwick received the description which he mentions in his letter of April 27, 1883, or the model which he mentions in his letter of July 5, 1883, from De Bange, it could not be considered in this case as a communication from the claimant company, appellee, or anyone authorized to represent it, to the duly authorized officers of the United States. De Bange at that time had no interest in the *patented* gas check here in suit, for he had assigned all of his interest therein to the claimant company. The first time the appellee appears to have had any direct relations with the Government was in the letter of its attorneys to the Secretaries of War and Navy, dated January 31, 1894 (Rec., pp. 49–53), unless it be assumed that when De Bange presented the claim here in question (Rec., pp. 43–47) he was acting as the agent of said company, which is not shown by anything in the record. If De Bange was acting individually, in his communications with Chadwick or in the presentation of the claim here in question in 1891 (Rec., pp. 43–47), then he could not bind the appellee or the Government by anything he did after he had assigned all his interest in the device described and claimed in the patent in suit. In that event, therefore, whatever there is in this case as an alleged basis for an implied contract in fact between the appellee and the Government must rest upon the

correspondence or relations between said company and the Government, which appears alone in the letters of its attorneys to the secretaries and the replies thereto (Rec., pp. 49–53).

Following the communication of appellee's attorneys of January 31, 1894, the Chief of the Bureau of Ordnance, under date of December 4, 1894, wrote the Secretary of the Navy. (Rec., pp. 51–52.) This communication is not sufficient to constitute an implied contract in fact, and, indeed, forms no basis wherein such contract could find its inception. It is simply a statement from the viewpoint of a subordinate officer of the Navy Department to the Secretary of the Navy and is in no sense a communication to the appellee, and there is no evidence that appellee took any action whatever by reason thereof. Nor was this statement by the Chief of the Bureau of Ordnance approved, referred to, or adopted by the Secretary of the Navy in his final reply to the attorneys of the appellee, dated December 31, 1894 (Rec., pp. 52–53).

From the facts disclosed it appears that there was no suggestion or request by the appellee to present the details of the patent to the Government either prior to or for nearly ten years after the issue of the patent; there was no examination by the board of officers as the result of anything done by the appellee. Whatever use there may have been was without recognition of title in the patentee to the thing used, because the owner of the

patent, appellee, had never presented itself or asserted its rights in the patented device until the letter of its counsel, dated July 31, 1894. When the appellee presented its claim through said letters to the Secretaries of Navy and War, said officials, as alleged in the petition (Rec., p. 6), "addressed a communication to petitioner's counsel referring to the questions involved in such claim." (See letter of the Secretary of the Navy, dated Dec. 31, 1894, Rec., pp. 52–53.) It is manifest that there was never any meeting of the minds of the parties concerned in this case, either as to the scope of the patent in suit, as to the identity of the structure of the device used by the Government with that of the patent in suit, or as to the recognition of any obligation by the Government, or as to any promise on the part of the duly authorized officers of the Government to compensate the appellee for such use. The appellee has owned the patent in suit from the date of its issue, and it is the rights of the appellee under said patent alone which is the subject here for determination. Resting the case solely upon what took place between the appellee and the United States, there is nothing in the record to show a meeting of the minds, or agreement as to compensation, which this court has held to be an essential requisite as a basis for an implied contract in fact. (*Russell* v. *United States,* 36 C. C. R., 581; 182 U. S., 516; *Harley* v. *United States,* 39 C. C. R., 105, 114; 198 U. S., 229–234.)

In the Harley case Chief Justice Nott, who wrote the opinion of the Court of Claims, said:

> Of what are called, generally, "implied contracts" there are two kinds. The first is where a man has tortiously taken property and the owner waives the tort and sues *in assumpsit*. In such cases there is no meeting of the minds. It would be absurd to hold by legal fiction that their minds met when the defendant unlawfully and against the owner's will took his property or when, without the owner's knowledge, he sold it. Such cases rest upon the principle that if the owner chooses to waive a tort and sue for the money derived from his property which is in the defendant's hands, the defendant can not set up his own unlawful conduct as a defense. The second kind of implied contracts is where the parties met and their meeting resulted in a wordless agreement.

The distinction between the *two kinds* of implied contracts is also clearly set forth in A. & E. Ency., 2d ed., Vol XV, pp. 1077–1078.

In affirming the judgment of the Court of Claims in Harley's case, Mr. Justice McKenna, who delivered the opinion of this court, said:

> We held in *Russell* v. *United States* (182 U. S., 516, 530) that in order to give the Court of Claims jurisdiction, under the act of March 3, 1887 (24 Stat., 505, c. 359), defining claims of which the Court of Claims had jurisdiction, the demands sued on must be "founded on" a convention between the

> parties—"a coming together of minds." And we excluded, as not meeting this condition, those contracts or obligations that the law is said to imply from a tort. (*Schillinger* v. *United States,* 155 U. S., 163; *United States* v. *Berdan Firearms Mfg. Co.,* 156 U. S., 552.)

As to the jurisdictional question, whether there is a proper basis for an *implied contract in fact,* the case at bar can only be ruled by the Berdan case by finding, as a matter of fact, that (1) the De Bange *patented invention* was used by the officers of the United States with the permission and assent of the petitioner, the owner of the patent; and (2) that said officers so used the *patented invention with the understanding between them and the petitioner that the Government would pay for such use.* The mere obtaining of knowledge of the De Bange *unpatented,* or even of his patented, invention by the officers of the Government from De Bange or his assignee and the subsequent use of such invention by the Government did not and could not, in and of itself, create an implied contract in fact to pay compensation for such use. If this were otherwise, all that a patentee would have to do, in order to create and fix a basis for an implied contract in fact with the Government respecting his patented invention, would be to show some official in authority his invention, and on the mere adoption and use of the same by the latter, claim that an implied contract in fact arose on the part of the Government to pay

compensation for the use. If such a transaction created an implied contract in fact to pay for the use of a patented invention, it would, of course, also create a correlative right in the user to freely operate under the patent, provided only he paid a reasonable compensation therefor, with the disastrous result of rendering the *mere use* of a patented invention by one to whom the patentee had exhibited his patent the foundation of a claim on the part of the user to a license under the patent, which the patentee would be in no position to escape or contest. Such a dire consequence would render patentees very chary of exhibiting their inventions for fear of involuntarily creating licenses to use the same on terms over which they would have no control.

The Berdan case demands that there must be something more than *a mere use* of the patentee's invention, with his knowledge, to create an implied contract in fact to pay for such use, that is to say, there must be, (1) a use of it with the patentee's assent, and there must *also* be (2) an *agreement* or *meeting of minds* on the part of the patentee and on the part of the user *as to compensation for the use,* even though the amount of the compensation be not fixed.

According to the nineteenth finding, Berdan "was in constant communication with the ordnance officers requesting the use of his patented device by the Government; the officials in authority knew him as an inventor, and knew his inven-

tions as soon as they were patented," the particular invention there in question being known even before it was patented, and, according to the twenty-third finding, " plaintiffs have desired the Government to use their patented devices, and have also desired and requested compensation for such use." As to these findings this court said:

> So far, then, as the petitioner is concerned, the use of this invention was with its consent, in accordance with its wish, and with the thought of compensation therefor.

In the case at bar there was no request on the part of appellee previous to the granting of the patent that the De Bange patented invention be used by the Government, as there was in the Berdan case. Knowledge of the De Bange invention was not first communicated to the Government by the appellee nor its agents. What *is claimed* by the appellee to be the De Bange invention was known to the world by publications and disclosures abroad and in this country before appellee or any of its agents had any communication with any officers of this Government, as appears from the article in Revue d'Artillerie, published in 1878–79 (Rec., pp. 28–32), and from Ordnance Notes No. 292, published by the War Department on April 20, 1883 (Rec., pp. 32–40 and 41). When Lieut. Commander Chadwick obtained the detailed description of the *unpatented* De Bange gas check forwarded with his letter of April 27, 1883 (Rec., p. 40), neither the appellee, nor anyone for it, had con-

sented to the use of the invention, nor claimed any compensation for its alleged use. *Furthermore, at that date it was not known that De Bange ever intended to take a patent in the United States.* In fact, at that date his application for patent had not been filed. A comparison of the description of the De Bange gas check as it was known abroad and as contained in the Chadwick letter of April 27, 1883 (Rec., pp. 40, 42), with the description of the construction and operation of the device disclosed in the patent in suit (Rec., pp. 14–20), clearly shows that the two things—the *unpatented* and the *patented* gas check are materially different in important and essential respects. This discrepancy between the terms of the patent and the description of the unpatented gas check tends to produce confusion, and it is necessary to bear in mind that the actual (unpatented) De Bange gas check and the *patented* gas check *are not the same.* Another consequence of the discrepancy is that only the working of the unpatented De Bange gas check is known, while the working of the patented De Bange gas check is only surmised, since the device actually used by the Government has been either the Davis or Gerdom patented type of gas check.

The essential differences between the actual (unpatented) De Bange gas check and the patented type are these: In the former the pad is placed between two tin cups, one in front of and the other behind it, the edges of these cups being protected

by brass split rings, one in front of the front cup and the other behind the rear cup. When the gun is fired the pad expands radially, so as to touch the walls of the chamber, and in the course of this expansion it also forces the tin cups to expand radially, so that their edges press tightly against the walls of the chamber. The forward tin cup, supported at its rim by the front split ring, is what actually excludes the gas if the mechanism works properly. In the *patented* gas check the pad is immediately inclosed between copper shells of peculiar shape, placed about its inner and outer radial sides instead of front and rear. Strong shells of brass are placed in front and rear of these copper shells, but there are no split rings, and their use is not even suggested in the patent. The pad does not actually touch the walls of the chamber at any time, and the apparent intention is that when the gun is fired the exterior copper shell shall be pressed tightly against the walls of the chamber, and so exclude the gas. In the drawings of the patent the shape of the brass shells M^3 M^3 is shown, and as they do not overlap the pad, any intelligent mechanic would understand how they should be made. They are called "rigid shells" (see claim 3), but as they are also described as "portions" of "a relatively soft and expansible packing ring," they must necessarily expand somewhat. In general shape these brass shells resemble thé tin cups of the actual (unpatented) De Bange gas

check, but they differ from the latter in construction (being incapable of the same diametric expansion either because their diameter is less or because of their greater rigidity), and they serve a different purpose. They are apparently intended merely to "maintain the form" of the yielding packing as a whole while "allowing a small amount of radial expansion" on the part of the body M′ and the outer copper shell M^2; whereas in the actual (unpatented) De Bange gas check the tin cups themselves expand radially and check the gas by their pressure against the wall of the chamber. The fact that the brass shells M^3 M^3 of the patented gas check were not apparently intended to come into contact with the wall of the chamber, explains why their edges are not protected by split rings, as are the edges of the tin cups in the actual (unpatented) De Bange gas check. The expansion of the former was evidently expected to be too slight to make split rings necessary. The copper shells M^2 M^2 of the patented De Bange gas check do not resemble in structure any parts of the actual (unpatented) De Bange gas check. Moreover, although they are very important features of the device (the outer shell being designed to actually exclude the gas), and are also of a peculiar shape, the specification does not indicate in any way how they should best be made. It is clear that they can not, either of them, be made without joints, for if they were so made

the pad could not be placed between them. Whatever was intended to be the precise construction of these shells, the failure to describe it shows of itself the purely theoretical character of the device covered by the patent. It was not a thoroughly well-thought-out invention, tested by experiment, but merely an idea—a theory—of how a gas check might perhaps be constructed, without any attempt to make sure that it was practically operative. Whether the patented De Bange gas check be practically operative or not, it is manifestly something different from the actual (unpatented) De Bange gas check. If the patented gas check be operative, it operates to check the gas by the direct action of copper shells of peculiar shape, which are not found in the so-called unpatented De Bange gas check, *either in themselves or by their mechanical equivalents.* In the so-called unpatented De Bange check the gas is checked by the direct action of tin cups, which differ in construction from everything shown and described in the patent. Even if it were shown, which is denied, that the two gas checks produced substantially the same result, yet it is manifest from a comparison of the descriptions as to their construction and operation that they do not produce the result in substantially the same way, and hence they are not the equivalent of each other.

As the so-called, actual (unpatented) De Bange gas check was public property abroad long before

the time of the Chadwick letters, it is the natural presumption that it was also public property in this country. The gas check which Lieut. Commander Chadwick forwarded to the Navy Department with his letter of July 5, 1883 (Rec., p. 42), was not obtained by him from De Bange nor from the appellee, but from the French minister of war. No consent to the use of the De Bange patented gas check by this Government and no claim for compensation for the use of said device was made, on the delivery of this gas check to Lieut. Commander Chadwick, by De Bange, by the appellee, by the French minister of war, or by anyone else, because at that time there was no patented De Bange gas check. Nor is there any evidence that it was known at that time by any officer of our War or Navy Department that De Bange had filed an application for patent in this country, or had any rights that this Government was bound to respect. When the description of the De Bange gas check (unpatented), which was contained in the Chadwick letter of April 27, 1883 (Rec., pp. 40 and 42), is compared with the description of said unpatented gas check, which was published in Ordnance Notes No. 292 (Rec., pp. 32–40, and 41), it will be seen that the description of what De Bange had actually designed in the way of a gas check was the same in both instances in all essential respects, and it was this unpatented De Bange gas check, as described in the Chadwick letter and in Ordnance Notes No. 292 which was exhibited to the gun-foundry board

and referred to in its report of August 29, 1883. The drawings of the De Bange gas check accompanying Ordnance Notes No. 292 (Rec., p. 41) show that the canvas containing the asbestos and grease bears against the bore of the gun and that the tin plates rest against the side of the asbestos ring and do not overlap the edges of the same. This is not what is shown and described in the patent in suit. There is no evidence that, for a period of at least seven years after the patent issued (Rec., pp. 43–47), the form of De Bange's gas check specifically described, shown, and claimed in his patent in suit, was brought to the attention of any officer of our Government whose statements, declarations, or conduct could be said to bind the Government as under an implied contract in fact. The contention that the description furnished by De Bange through the Chadwick letter of April 27, 1883, and exhibited to the gun-foundry board are circumstances tending to constitute a basis for an implied contract in fact, is absolutely without force, unless it were definitely established, which it is not, that the officers of this Government in authority were then informed that De Bange would apply or had applied for a patent on that particular device, and that the construction and operation of the gas check thus described and exhibited were identical with that subsequently described, illustrated, and claimed in the patent in suit. There must be absolute identity with reference to the device *then* under consideration and that subsequently patented

before there could have been a *meeting of minds* between the parties as to the use of the device in question. If the parties between whom an implied contract in fact is alleged to have arisen were discussing devices of essentially different character of construction and operation, there could be no understanding or meeting of minds as to the identity of the device actually used by the Government with that of the patent in suit. And this lack of identity between the structure of the device described by Chadwick and exhibited to the gun-foundry board, and the device of the patent in suit, is the very essence of the whole proposition; and it is clearly apparent that at the different times above stated they were considering and discussing devices of materially different character, and hence there was no understanding or agreement as to the identity of the device actually used by the Government with that of the patent in suit. In Harley's case this court said:

> We held in *Russell* v. *United States* that in order to give the Court of Claims jurisdiction, under the act of March 3, 1887, defining claims of which the Court of Claims had jurisdiction, the demand sued on must be founded on "a convention between the parties—'a coming together of minds.'" And we excluded, as not meeting this condition, those contracts on obligations that the law is said to imply from a tort.

Of course the learned Justice did not mean when referring to a "coming together of minds" that there must be an expressed agreement, for that would constitute an express contract; but what he obviously did mean was that there must be an *unexpressed understanding*. This refers to a state of mind, to matter of intention, as gathered from the acts and conduct of the parties.

Now, let us see what the understanding was in Berdan's case. The state of mind of the claimant was undoubted. He urged the Government to use his invention, consented to its use, always with the thought and expectation of compensation. The findings and judgment show also that the state of mind of the Government officers with whom he dealt was that he should be compensated. This was evidenced by the repeated declarations of Gen. Benet, made before and after the adoption of Gen. Berdan's improvement, that the inventor whose patented invention had been adopted by the Government should receive compensation. It was a deduction, well justified from the facts, that there was a meeting of minds between Berdan, on the one hand, and Gen. Benet, representing the Government, on the other, that Berdan was to be compensated.

In the case at bar, there is nothing indicating that the appellee expected compensation at the time when the patent in suit was granted or when the use alleged herein began, as the appellee was not heard from directly on this subject for nearly ten

years after the patent had issued, namely, when its attorneys wrote their letters to the secretaries (Rec., pp. 49–53). It communicated nothing to the Government officers that added anything to their sum of knowledge already procured from other sources open to the public at the time the application for the patent was filed and when the use alleged herein began. It made no claim for compensation, unless the letter of Col. De Bange to our minister in Paris, Mr. Reid, in 1891 (Rec., pp. 43–44), could be considered a claim made by the appellee for compensation. If that letter is such a claim, then it is a claim not for an authorized or permitted but for an *unauthorized and surreptitious use;* in other words, for tortious use, out of which no implied contract in fact to pay compensation could arise.

The findings of fact in the case at bar disclose no evidence whatever that the appellee consented to the use of the De Bange *patented invention* by the Government, or that it expected compensation for the use of said invention until the patent had been in existence *at least seven years,* if it be assumed, for the sake of the argument, that when De Bange presented the claim for compensation in his letter of June 29, 1891 (Rec., pp. 43–44), he was then acting as the agent of the appellee. On the other hand, if it be determined that at that time De Bange was not acting as the agent of the appellee in thus presenting the claim, then there is no evidence of any presentation of the claim on the part of the appellee until the filing

of the letters from its counsel on January 31, 1894 (Rec., pp. 49–51), *nearly ten years* after the issuance of the patent in suit.

Up to these relative dates, the latter of which is definitely fixed while the former rests upon the determination of the question of agency on the part of De Bange, the first of the conditions laid down in the Berdan case as essential to the creation of an implied contract in fact is lacking, namely, the affirmative consent of the patentee to the use of the *patented* invention.

Coming now to the consideration of the other condition laid down in the Berdan case as essential to the creation of an implied contract in fact, namely, the use of the *patented* invention by the officers of the Government *with an understanding that the Government would pay for such use,* there is an entire dearth of evidence, unless the *mere fact of use* by the Government of a device, referred to in general terms as the "De Bange gas check," and without relation to the *patented device,* implies such an understanding—which the Berdan case decides it does not.

Lieut. Commander Chadwick did not say, on April 27, 1883, or at any other time, that compensation would be given or was expected; nor did the gun foundry board in 1883 have any legal authority (22 Stat. L., 474) to make, nor did it make, any such statement at any time; nor did the Navy Department or the War Department, at any time, make such a declaration.

The members of the gun foundry board had no authority to recommend or adopt De Bange's improvement. They were not appointed for any such purpose. They learned nothing in France from De Bange or the appellee that they had not previously learned elsewhere, or which was not known and published. The patented invention in question was not submitted to them for the use of this Government with any expectation of compensation and could not have been at that time. This Government did not adopt what was exhibited to the board, but something else—namely, the Davis and Gerdom patented gas checks. The board made no declaration, like that of Gen. Benet in Berdan's case, as to being of opinion that the claimant should be compensated. This Government used what it used—namely, the Davis and Gerdom devices—before any demand or request for compensation on the part of the appellee; without any agreement for compensation; without any intention expressed to give compensation; and without any course of conduct from which an agreement to give compensation could be implied, unless such an agreement is to be implied from the *mere use,* which the Harley case contradicts, the language of this court being—

> and the use of the device can not give a right independent of the understanding under which it was used. (198 U. S., 234.)

The Government *used* what it used *under a claim of right* derived from the Davis and Gerdom patents, for which it paid. If it did not deny the appellee's rights, it was only because they had not at that time been asserted. Certainly no denial of a right until asserted is called for where the question is as to the effect of failing to deny a right.

Subsequently, when the claim here in question was presented, by the attorneys representing the appellee, to the Secretaries of War and Navy, on January 31, 1894 (Rec., p. 49), those officials were very careful not to make any acknowledgment, either for themselves or the Government, of the société's right to compensation. On the contrary, the concluding paragraph of the letter of the Secretary of the Navy to this communication from appellee's attorneys refers to a previous denial and rejection, on September 3, 1891, in the letter to the Secretary of State, of the claim presented by De Bange, and *reaffirms this action* of the Navy Department at that time in the following language (Rec., p. 51):

> I inclose herewith, for your information, a copy of the letter addressed to the Secretary of State by this department, under date of September 3, 1891, conveying its *decision* in regard to the matter before it.
>
> As the status of the case *has not changed* since the date of the department's letter above mentioned, and as the matter *has been previously disposed of by the department,*

> no further consideration of the case appears to be required.

(Italics ours.)

The letter of September 3, 1891, referred to in the above quotation from the letter of the Secretary of the Navy written February 10, 1894, is set forth in full (Rec., pp. 46–47), and concludes with the following words:

> In view of the statement made by the Chief of the Bureau of Ordnance, *there appears to be no proper ground for the claim* of Col. De Bange.

(Italics ours.)

Surely it can not be argued, notwithstanding the Navy Department had reached a "decision" (Rec., p. 51) to the effect that there was "no proper ground" for the claim in question (Rec., pp. 46–47) and the parties respectively presenting said claim had been officially notified of the department's action, that there is anything disclosed by the facts on which to predicate an "understanding" that the Government would pay for the use of the De Bange *patented* invention, or for the use of any invention made by De Bange.

An attempt was made in the court below to attach undue importance to a statement of the Chief of the Bureau of Ordnance (Rec., pp. 51–52), as though it should be given decisive weight in determining the question as to the existence of an implied contract in fact. It should not be seriously

considered that the language of Admiral Sampson can be held to bind the Government in any way to a *recognition of the title* of the appellee to the device used by this Government under arrangement with the patentees, Davis and Gerdom. This officer manifestly had no authority to do any such thing, and the suggestion contained in his comment was never accepted by the Secretary of the Navy (Rec., pp. 52–53) or any officer of the Government authorized to bind the Government in any contractual relation. (See *Sprague* v. *United States*, 37 C. C. R., 447–455, 456.) This language of Admiral Sampson's certainly can not be expanded by the force of any possible argument into any basis upon which to found an implied contract in fact on the part of this Government to pay compensation to the appellee. It was merely the communication of a subordinate in the Navy Department to his chief, the Secretary of the Navy, and it should not be held in any sense binding either upon the appellee or upon the Government. Sections 3744 and 3747, United States Revised Statutes, provide for the making of contracts with the United States, in its Navy Department, War Department, and Interior Department. These statutes explicity state who are authorized to make such contracts. They practically and legally constitute a "statute of frauds." This proposition has been ably and explicitly maintained in an opinion of the Court of Claims delivered by Judge Howry in the case of *McLaughlin* v. *United States*

(37 C. C. R., 150, 185, 197 and cases therein cited). It would seem clear, therefore, that no implied contract in fact with the United States can arise from the action of any officer of the United States who is not authorized under the statutes above cited to make an express contract. (See *Clark* v. *United States,* 95 U. S., 539, as distinguished in *St. Louis Hay and Grain Co.* v. *United States,* 191 U. S., 159.)

But if the proposition were otherwise, it is insisted that the action of Admiral Sampson, which is the only proven act by any subordinate officer of the United States between the time the appellee presented its claim on January 31, 1894, and the time of the final reply thereto of the Secretary of the Navy, dated December 31, 1894 (Rec., pp. 52–53), can not be construed into a recognition of the validity or merits of the claim of the appellee. That neither the language of Admiral Sampson nor the letters of the Secretary of the Navy and the Secretary of War were in any way a recognition of the claim presented on behalf of the appellee by its attorneys will further appear from the language of the petition in this case. Neither the original petition (Par. X, p. 5, Par. XIII, p. 6) nor the amended petition (Par. X, p. 12) alleges the necessary facts required to support an action founded upon an implied contract in fact, or which are sufficient to show the *meeting of minds of the parties,* as required by this court in Russell's case and Harley's case, *supra.*

On the contrary the allegations show that after the claim was first directly presented, the representatives of the United States who were authorized to make contracts, "*declined to pass upon* the claim of your petitioner" (Rec., p. 5) and thereafter finally refused to come to any agreement with the petitioner relative to its claim (Rec., pp. 6, 52–53).

It is respectfully submitted that the Court of Claims, instead of holding the case at bar to be governed by the Berdan case, should have held it to be ruled by the latter cases of *Russell* v. *The United States* (182 U. S., 516) and *Harley* v. *The United States* (198 U. S., 229), wherein this court has clearly laid down and defined the radical and material difference existing between *an implied contract in fact* and *an implied contract in law,* and pointed out that the statutory jurisdiction of the Court of Claims is limited to the determination *only* of such cases relating to the use by the Government of patented inventions, as constitute *an implied contract in fact,* as distinguished from *an implied contract in law—one which arises from a tort.*

In the Russell case, the invention involved was an improvement in firearms. Claimant had a patent for the invention. He submitted to a board of United States officers, convened under an act of Congress, a rifle made in accordance with his patent. His rifle was not adopted by the board, but another one—the Krag-Jörgensen rifle, claimed by Russell to embody his patented invention—was adopted. The claimant in that case, in a communication

to the War Department, under date November 16, 1892, called attention to his patent and to the fact that it covered the Krag-Jörgensen rifle, and requested that in "considering the allowance to inventors," his claims be regarded. The department replied that "should the Government proceed to manufacture the arms your course will be to bring a suit against the Government in the Court of Claims after manufacture has progressed." Again on December 9, 1892, the claimant requested that the Ordnance Office allow him "a hearing before any business arrangement with the Krag-Jörgensen Company" be closed, which letter was returned with the indorsement "that a statement of the case should be made in writing for filing at this office and for future reference, as the case stated can not be determined by the Ordnance Office."

On this state of facts this court held:

> Indeed, the Ordnance Office twice wrote Capt. Russell that his case could not be determined by it. No contract, therefore, based on the action of that office can be claimed. If petitioners have suffered injury it has been through the infringement of their patents, not by a breach of contract, and for the redress of an infringement the Court of Claims has no jurisdiction. This doctrine may be technical. If the United States was a person, on the facts of this record (assuming, of course, the petition to be true) it could be sued as upon an implied contract, but it is the prerogative of a sov-

> ereign not to be sued at all without its consent, or upon such causes of action as it chooses. It has not chosen to be sued in an action sounding in tort, this court has declared, as we have seen. (182 U. S., 535.)

The learned justice evidently had in mind the distinction between contracts *implied in fact* and contracts *implied in law*, and that while the case before him disclosed an implied contract, it was an implied contract *in law;* that is, one that grew out of a tort—that sounded in tort—and that it was *not*, therefore, cognizable by the Court of Claims under the statutes defining its jurisdiction.

The language of this court in Russell's case squarely applies to the facts found in the case at bar. There was there, as here, no meeting of minds, no agreement, as to the right to compensation. When at last the appellee in the case at bar asserted its claim for compensation (Rec., pp. 49–51) the Government officers refused to admit its soundness. After having reached a "decision" that "there appears to be no proper ground for the claim" (Rec., 47 and 51) the mere circumstance that the Secretary of the Navy finally suggested to the representatives of the claimant that proper proceedings be had for the determination of the validity of the patent and other incidental questions by the Court of Claims, surely can not be said to constitute an acknowledgment of the merits of the claim by the Navy Department or any officer of the Government. This suggestion

is identical in its nature with the one which was made to the claimant in Russell's case by the head of the department to which the proposition had been submitted, and this court in deciding said case clearly indicated its view of the limitations which must be placed upon departmental replies of the character shown in the Russell case and the case at bar, suggesting proceedings in this court. (182 U. S. 532.) Furthermore, it will be noted that in the opinion in Russell's case a distinction was drawn between "the thought of an arbitrary invasion" by Government officers of the claimant's rights, on the one hand, and the absence of any evidence of intention by those Government officers on the other hand *to make an agreement,* a convention between the parties, or the purpose of the Government to pay compensation. In this connection the court said:

> There was no concession of his rights. He was told twice that his case could not be determined by the Ordnance Department. There was probably, however, no thought of an arbitrary invasion of his rights. The Ordnance Office sought the opinion of the Commissioner of Patents, and was informed that the Krag-Jörgensen improvement in machine firearms had been examined, and the invention had been found patentable in view of the state of the art. The patent of petitioners was part of the state of the art. The opinion of the commissioner, of course, was not necessarily conclusive. As he him-

self said: "Questions of infrigement belong to the courts." And because such questions are for the courts, the Ordnance Office, no doubt, took indemnity from the Krag-Jörgensen Co., not in concession of petitioner's claim, but for protection against it, if protection should be necessary, and whether it would be or not the Ordnance Office very naturally resolved not to determine. The prudence which takes a bond against a claim can not be said to constitute or raise a contract in favor of the claim—can not be said to have intended to create the liability which was meant to be forestalled.

Indeed, the Ordnance Office twice wrote Capt. Russell that his case could not be determined by it. No contract, therefore, based on the action of that office, can be claimed. If petitioners have suffered injury *it has been through the infringement of their patents, not by a breach of contract, and for the redress of an infringement the Court of Claims has no jurisdiction.* This doctrine may be technical. If the United States was a person, on the facts of this record (assuming, of course, the petition to be true) it could be sued as upon an implied contract, *but it is the prerogative of a sovereign not to be sued at all without its consent or upon such causes of action as it chooses.* It has not chosen to be sued in an action sounding in tort, this court has declared, as we have seen (182 U. S., 535).

(Italics ours.)

The suggestion contained in the letters of the secretaries in Russell's case, as likewise in the case at bar, as to recourse to the Court of Claims is purely gratuitous. It did not confer any rights upon the patentees and it did not bind the Government in any implied promise to compensate the patentees for the alleged use of the inventions in question. If such letters as these from the Secretary of the Navy (Rec., pp. 47 and 51) can be held as alone sufficient to furnish a basis for an *implied contract in fact,* then any claimant may secure evidence of such contract by presenting his claim to the head of a department and upon receiving a reply denying compensation and suggesting that claimant go into the Court of Claims construe such suggestion as evidence of an implied contract in fact and contend that the court thereby has jurisdiction. It requires more than such one-sided proceedings as this on the part of the patentee to constitute an implied contract in fact *between the parties.* There must be evidence of an *agreement* or a *meeting of the minds* as to (1) the title of the claimant to the *patented* invention in question; (2) the use by the Government of the invention *patented;* (3) the intention of the Government through its authorized officials to compensate the claimant for said use, although the amount of such compensation is undetermined.

The Court of Claims in its opinion in the case at bar said:

> The findings disclose an invitation to present the details of the patent to the defend-

> ant, its examination by a board of officers appointed to investigate such inventions, and its final use *without the slightest claim of ownership*. Nothing appears to show an intention to dispute claimant's title to the patent, hence an implied contract arose to pay for such use.

(Italics ours.)

Now, it is submitted that the findings of fact in the case at bar do not, under the authorities laid down by this court, justify the conclusion of the court below that there was an *implied contract in fact*. In Russell's case there was (1) "an invitation to present the details of the patent to the defendant and its examination by a board of officers appointed to investigate such matters," but in the case at bar it appears from the findings of fact that the gun foundry board could not have received "an invitation to present the details of the patent," because there is no notice that patent would be applied for at that date, nor did the gun foundry board have any authority under the statute creating the same to adopt any *patented* devices. In its statement of facts this court in Russell's case said:

> That pursuant to an advertisement by a board of officers convened under the act of Congress approved February 24, 1881, to select a magazine rifle for the service of the United States, Russell submitted to said board an operative magazine *rifle made in accordance with his letters patent*, etc.

(Italics ours.)

So also in Russell's case there was (2) "its final use without the slightest claim of ownership." Russell's invention was simply used. There was no claim of ownership on the part of the Government or its officers to the device there in question, while in the case at bar the Government was using the patented device of Davis and Gerdom.

This court said in Russell's case:

> There was no concession of his rights. He was told twice that his case could not be determined by the Ordnance Department. There was probably, however, no thought of an arbitrary invasion of his rights.

So, in the case at bar, there was likewise no concession of the appellee's rights, and it was finally told (Rec., pp. 52–53), after two previous rejections of the claim when presented (pp. 47 and 51), that its case could not be determined by the department and it was referred to this court.

Again, in Russell's case (3), "nothing appeared to show an intention to dispute claimant's title to the patent," unless, as in the case at bar, a refusal to accede to the appellee's claim for compensation and a reference of the whole matter to the Court of Claims constitute such a dispute of title. In this connection the case at bar is even stronger for the appellant herein than Russell's case in this respect, namely, that there was certainly no admission of appellee's title to the *patented* invention in question, and it is believed that a "dispute"

of said title is contained in the following language from the final letter of the Secretary of the Navy (Rec., pp. 52–53):

> *It appears that the matter is now in such a condition that it will in all probability involve not only questions arising under the patent issued to Col. De Bange but also those growing out of the claims and affecting the rights of other patentees.*

(Italics ours.)

But assuming, for the sake of the argument only, that the facts in Russell's case and the case at bar are precisely parallel, the conclusion of the Court of Claims in this case that (4) "hence an implied contract arose to pay for such use," was not justified any more than such a conclusion would have been justified in Russell's case. In Russell's case, as in the case at bar, the precise thing decribed and shown in the claimant's patent was not used by the Government, but a different form of device, asserted to fall within the claimant's patent, was used. The cases were, in fact, both cases of *infringement,* pure and simple, and therefore not cognizable by the Court of Claims, because, in essence, suits for damages sounding in tort.

In line with the Russell case is the still later case of *Harley* v. *United States* (198 U. S., 229). In that case the claimant had a much stronger contention for an implied contract in fact than the appellee has in the case at bar, although the Court

of Claims dismissed the petition and its judgment was affirmed by this court.

It appears from the findings of fact in that case that Harley brought his invention—an improvement in registers designed for attachment to printing presses—to the attention of the Chief of the Bureau of Engraving and Printing *before it was patented*. The register was tried by the chief of the bureau and found satisfactory. The chief then proposed to take the claimant to the Secretary of the Treasury that the invention might be explained to the latter. The claimant objected on the ground that the invention was not patented. The chief replied: "I will see that you are protected." They went before the Secretary and explained the invention. The Secretary approved the register and directed that others be made and attached to the presses of the Bureau of Engraving and Printing. Before the registers were manufactured the claimant again remonstrated that he wished first to secure a patent. The chief of the bureau replied that he would see that the claimant was protected and would get him a patent attorney who would explain the law to him. This he did, and a patent was obtained, the claimant paying the cost thereof.

In commenting on the findings, Mr. Justice McKenna, speaking for this court, said:

> In the case at bar the Court of Claims finds that the appellant "supposed and understood that he would be entitled to compensation and that it would be allowed and paid

> by the Secretary of the Treasury"; *but it also finds that* "on the part of the Secretary and chief of bureau (Engraving and Printing) it was supposed and understood that the claimant (appellant), being an employee of the Treasury Department, would neither expect nor demand remuneration." That there was "a coming together of minds" is therefore excluded by the findings. *And the use of the device can not give a right independent of the understanding under which it was used.*

(Italics ours.)

Appellee contends that there was an expectation on its part growing out of the alleged use by the Government of the so-called unpatented De Bange gas check, that the Government would pay compensation for the use of the gas check which was adopted by the Army and Navy under arrangements with the patentees, Davis and Gerdom, if it should be judicially determined that appellee's patent covered the gas check so used. Such an expectation could not be legally well founded on the facts here presented; but assuming it to have existed, as it actually did exist in Harley's case, there still lacks other *essential* conditions for an implied contract in fact. The difficulty here is, as in Harley's case, there is no evidence properly deducible from the findings of any *expectation* on the part of the Government's authorized officials that the United States would pay compensation, unless the

mere use of the invention constitutes evidence of such an expectation and promise to pay, which the Berdan case, the Russell case, and the Harley case *all negative.*

Russell's case and Harley's case illustrate the rule that the mere use of an invention by the Government, without more, raises no implied contract in fact to pay for the use, such as is cognizable by the Court of Claims.

The Berdan case, on the other hand, illustrates the rule that the use of an invention *coupled with an expectation to pay for the use, and the understanding or meeting of the minds of both parties that payment is to be made,* constitutes an implied contract in fact of which the Court of Claims may take jurisdiction.

It is respectfully submitted that there is nothing in the findings of fact from which it can be inferred that the officers of the Government authorized to bind it in contract expected or understood that payment would be made for the alleged use. The case therefore clearly falls within the rule established in the Russell and Harley cases and does not fall within the scope of the rule defined in Berdan's case, and, therefore, we contend the petition should have been dismissed.

QUESTION OF INFRINGEMENT.

FOURTH, FIFTH, AND SIXTH ASSIGNMENTS OF ERROR.

The findings of fact, we contend, disclose the existence of four different constructions of obturators

or gas checks, all using a pad of asbestos and tallow, as follows:

(1) The actual De Bange gas check, invented by appellee's assignor, Col. De Bange, some years before the date of the patent in suit, never patented, used in France and some other countries, but never used for service by the United States (Rec., pp. 40, 42, and 61).

(2) The gas check shown and described in the patent in suit, existing apparently only in that patent and never actually used anywhere (Rec., pp. 16–20).

(3) The Davis gas check, invented in order to overcome the practical defects of the so-called De Bange gas check, and temporarily used by the appellant (Rec., pp. 53–56).

(4) The Gerdom gas check, a still better invention than that of Davis, used by appellant in its Army and Navy service guns (Rec., pp. 56–60).

All these gas checks contained a pad of asbestos and tallow covered with canvas, except that the patent in suit neither shows nor mentions any such cover, which materials were first used for this purpose by Col. De Bange. On this account, probably, the expression " De Bange gas check " has been carelessly used in the United States to mean a gas check containing such a pad, without regard to the nature of the remainder of the structure.

The appellee's contention is that claim 1 of the patent in suit covers (1), (3), and (4), as well as (2). But this contention involves the construction

of the terms of claim 1 of the patent, which is a question of law. What is the thing patented " is a question of law to be determined by the court, construing the letters patent, and the description of the invention and specification of claim annexed to them." (*Winans* v. *Denmead,* 15 How., 330, 338. See also *Davis* v. *Palmer,* 2 Brock., 298, Fed. Cas. No. 3645; *Davoll* v. *Brown,* 1 Wood. & M., 53, Fed. Cas. No. 3662; *Parker* v. *Hulme,* Fed. Cas. No. 10740; *Teese* v. *Phelps,* Fed. Cas. No. 13819; *Ransom* v. *New York,* Fed. Cas. No. 11573; *Cahoon* v. *Ring,* 1 Cliff. 592, Fed. Cas. No. 2292; *National Car, etc., Co.* v. *Terre Haute Car, etc., Co.,* 19 Fed. 514; *Emerson* v. *Hogg,* 1 Blatch, 1, 6.)

As appellee repeatedly employed the term " the De Bange gas check " or " the De Bange obturator " in a very broad sense, attempting thereby to identify the device shown and described in the patent in suit with the gas check actually known and used in France and elsewhere; and as it was the latter, not the former, which was brought to the notice of the United States ordnance officers by Lieut. Commander Chadwick (Rec., 40–42), it may be well to make clear the essential distinctions between the two gas checks, and thereby avoid confusion. For the purpose of distinction, one has been referred to as the " actual " or " unpatented " De Bange gas check and the other as the " patented " De Bange gas check. A striking peculiarity of this case is that the patent sued upon shows and

describes a device which differs materially from that which De Bange invented, described to Chadwick, exhibited to the Gun Foundry Board, and which has always been known by his name, being called "the De Bange gas check" or "the De Bange obturator." (See ante, pp. 20–26 of brief.) The two devices may have been intended to accomplish the same result and they have certain similarities, but are not identical in either their construction or operation. The actual De Bange gas check has been described in various publications (Rec., pp. 29–32), has been used in France and other countries, and was described in the communication of Lieut. Commander Chadwick (Rec., pp. 40 and 42), as well as being published in Ordnance Notes No. 292 on April 20, 1883, issued by the War Department (Rec., pp. 32–40 and 41). The patented type of gas check, on the contrary, is something purely theoretical. No publication has been found, outside of the patent itself, which describes it.

INTERPRETATION OF CLAIM I.

There are but two claims of the De Bange patent No. 301220 that have been the subject of discussion in this suit.

These are claims 1 and 3, which read as follows:

> 1. The partially threaded plug B, headed pin N N′ extending through said plug, and the yielding packing M, arranged between the head N′ and the inner end of the plug, in combination with each other and with the

gun A, arranged as shown, to allow the pin to be driven rearward and compress the packing, as herein specified.

3. The packing M, having a tough yielding interior, M′, elastic shells M^2, and rigid shells M^3, arranged between the inner end of the screw-plug B and inner surface of the head N′ of the pin N, in combination with such parts B, N, and N′, and the whole arranged and serving relatively to the gun A as and for the purposes set forth.

Of these two claims, *claim 1, only,* was alleged by the appellee to have been used by the Government.

Therefore *the vital question in this part of the case is the proper interpretation of this claim.*

The controversy is really further narrowed to the interpretation of that element of the claim, which is referred to as " the yielding packing M."

The appellant contends that if, to save the claim, this element, thus designated as " the yielding packing M," is given a limited interpretation, such as will include all of the parts of the packing referred to in the specification of the patent as comprehended by the letter M, the Government is not liable, since it has never used a packing embodying those details; and that if this element characterized as "the yielding packing M" is given a broad interpretation, the claim is rendered invalid by the prior state of the art.

On the other hand, appellee contends in effect that this element of the claim is to be given neither

a narrow nor a broad interpretation, but an elastic interpretation, such as will just cover the devices used by the Government.

I.

The limited interpretation for which the Government contends is based upon the following considerations:

The specification (Rec., pp. 17–18) describes the packing element of the De Bange patented invention, as follows:

> A liberal hole in the line of the axis of the screw-plug B carries a stout sliding pin N, at the extreme front of which is a stout head, N′. The portion of the body adjacent to the head N′ is slightly enlarged. The head N′ is adapted to receive the force of the powder at the discharge. At the moment of the discharge this head moves backward, compressing a relatively soft and expansible packing ring, M, behind it. Certain portions of this ring will be distinguished, when necessary, by additional marks M′, M². The body M′ of this packing is of asbestos, saturated with tallow, and affords a sufficiently yielding mass with the required capacity for enduring heat and for withstanding the very strong compressive force to which it is subjected by the discharge. It is inclosed between two thin shells, M², M², of copper, one fitting the body M′ on the inner and the other on the outer side, and nearly incasing the entire packing. Both the body M′ and

> the copper M^2 are then inclosed between two strong shells of brass, M^3, M^3. The entire packing thus made is adapted to maintain its form but to allow a small amount of radial expansion sufficient to pack the joint tightly against the escape of gas. This expansion is due to two causes—the tapering form of the front end of the pin, N, which acts on the interior of the packing, and the powerful compression received from the head N′. The expansion from one or both causes is sufficient to press the exterior of the copper M^2 tightly against the interior of the gun, thus effectually preventing any leakage of gas.

It will be noted that the letter M, as here used, does not purport to designate any one of the individual portions or parts of which the packing is composed, but is rather used to designate the packing as a whole. After designating the packing as the "packing ring M," the specification says: "*Certain portions* of this ring will be distinguished, when necessary, by additional marks, as M′, M^2." After this statement, the body portion of the packing, which consists of asbestos and tallow, is described thus: "The *body M′* of this packing is of asbestos saturated with tallow," etc. Then the specification goes on to describe another part of the packing, namely, the copper shells, thus:

> It (meaning the asbestos and tallow body portion of the packing) is inclosed between

> *two thin shells, M^2, M^2, of copper,* one fitting the *body M′* on the inner and the other on the outer side.

Then follows a description of still another part of the packing, namely, the brass shells, the language used being "both the body M′ and the copper M^2 are then inclosed between *two strong shells of brass, M^3, M^3,*" and finally, in order to accentuate the fact that the packing is made up of the several enumerated parts, the specification industriously says:

> The *entire* packing *thus made* is adapted to maintain its form, etc.

By thus first referring to the packing, as a whole, by the letter M, and then proceeding to designate its component parts by separate letters of reference—that is to say, the asbestos and tallow body by the letter M′, the copper shells by the letters M^2 M^2, and the inclosing brass shells by the letters M^3 M^3—it would seem clear that the intention of the specification writer was not to use the letter M as designating the asbestos and tallow body portion specifically, or the copper shells specifically, or the inclosing brass shells specifically, but to refer to the whole packing and all of its parts, inclusively, as M. In a later part of the specification occurs the following:

> If there be any considerable adhesion of the packing M to the interior of the gun, it may be difficult to draw the screw plug endwise. (Mid. p. 18.)

Here again the letter M is used inclusively. It certainly does not refer to the asbestos and tallow portion of the packing alone, because the asbestos and tallow can not adhere to the interior of the gun, since it never comes in contact with it.

Another reference to the De Bange patent in suit will show that De Bange himself employed the usual and well-known practice in patent specifications of designating an element in a claim by a certain letter, when that letter was intended to refer to the *entire element as a whole*, constructed as described and shown. It will be seen by reference to the description of the element H in the De Bange patent (Rec., pp. 17–18) that he there refers to the whole part as H, although it is made up of minor parts H′, H², H³. This clearly indicates that when the yielding packing was designated M, it referred to that element as a whole, including its several parts M′, M², and M³, constructed as described and shown in the patent.

When, therefore, the specification writer came to draw claim 1, it is to be presumed that he used the letter M in the same inclusive sense that he did in the body of the specification. This view is accentuated by the fact that he referred, in the claim itself, to the body of the specification by the use of the index phrase " as herein specified."

Further support to this view is found in the fact that in drawing claim 3 the letter M was used in the same *inclusive* sense.

3. The packing M having a tough, yielding interior M′, elastic shells M^2, and rigid shells M^3, arranged between, etc.

That the letter M in claim 1 was not intended to refer to the asbestos and tallow part of the packing alone is further evidenced by the fact that in several parts of the specification such material is referred to specifically by another letter of reference, namely, by the letter M′, as follows:

> The *body M′* of this packing is of asbestos saturated with tallow.

Again:

> It is inclosed between two thin shells M^2 M^2 of copper, one fitting the *body M′* on the inner and the other on the outer side.

Again:

> Both the *body M′* and the copper M^2 are then inclosed between two strong shells of brass M^3 M^3.

Again, in claim 3:

> The packing M having a tough, yielding *interior M′*, etc.

Regarding, then, the words "the yielding packing M" in claim 1 as designating an element that includes all the parts of the packing for which M stands according to the descriptive portion of the specification, we have a claim narrowed and limited, as to its packing element, to the yielding packing composed of the asbestos and tallow body

material, the copper shells, and the brass shells; and inasmuch as the Davis and Gerdom devices used by the Government, while containing asbestos and tallow, do not employ the copper shells and the brass shells, they do not fall within the claim. (*Singer Mfg. Co.* v. *Cramer,* 192 U. S., 265.)

It is undoubtedly a rule in the construction of patents that no two claims of a patent are to be construed to mean the same thing if they may be differentiated.

> *Page Woven Wire Fence Co.* v. *Land,* 49 Fed., 936.
>
> *Tondeur* v. *Stewart,* 28 Fed., 561.
>
> *Bresnahan* v. *Tripp Giant Leveller Co.,* 102 Fed., 899.

And it may, therefore, be contended that the narrow interpretation which the Government places on claim 1 would make it the same in legal effect as claim 3. To this we reply, that *claim 3,* while in other respects like claim 1, is, as to the packing element, broader than claim 1, and therefore capable of being differentiated therefrom, because, instead of being limited to asbestos and tallow, as would be claim 1 under the construction that the Government places upon it, it is broad enough to cover a packing "having a tough, yielding interior," which designation, while it would include asbestos and tallow, would also include material of a "tough, yielding" nature other than asbestos and tallow, such, for instance, as pasteboard.

If claim 1 is thus narrowly construed, and limited, so far as its packing element is concerned, to a packing composed of (1) asbestos and tallow, (2) copper shells, and (3) brass shells, it may be held to be valid, but it will not cover any form of device that the Government has used, because neither the Davis device, nor the Gerdom device, includes asbestos and tallow contained between copper shells and brass shells, as found in the De Bange structure.

II.

The only other possible interpretation that can be placed upon claim 1 is a very broad interpretation, an interpretation that would render the element "the yielding packing M" broad enough to include not only the specific yielding packing described in the specification, namely, the packing formed of asbestos and tallow, the copper shells, and the brass shells, but also any other yielding packing of whatsoever description.

It may well have been the intention of the specification writer to draw this claim as a broad claim, covering all yielding packings, and to have used the letter M merely for the purpose of a general identification of the packing element and not as a limitation of the claim to the details of the particular packing M described in the specification.

Support for this view is found in the circumstance that claim 3 is like claim 1, save for its particular characterization of the packing element as

one consisting of "the packing M, having a tough yielding interior M′, elastic shells M^2, and rigid shells M^3." If it had been intended, by the use of the words "the yielding packing M" in the first claim, to have included thereby all the details that went to make up the packing, the *third* claim would seem almost to have been unnecessary, as it would have been so nearly a duplication of the *first* claim.

Further support for this view is found in the fact that nothing was cited by the Patent Office during the prosecution of the De Bange application that showed to the applicant that a broad claim was not patentable. The Quick patent, No. 258116, of May 16, 1882, alone was cited, but that patent was not alone an anticipation of a broad claim, since it did not contain all of the elements of the combination.

And still further support is found in the fact, doubtless known to the writer of the specification, that the courts, in treating broad claims, often regard the use of reference letters to designate the elements of a combination claim, not as limiting the claim to the precise details of the elements to which the letters apply, but as covering, as well, all substitutes for such elements having differing details.

Consolidated Safety Valve Co. v. *Crosby Steam Gage and Valve Co.*, 113 U. S., 157.
Reed v. *Chase*, 25 Fed., 94–99.
Delemater v. *Heath*, 58 Fed., 414.
Bonnette, etc., v. *Koehler*, 82 Fed., 428.

Had the patentee, appellee herein, actually considered that claim 1 was not as broad as it was intended to have drawn it or as it might have been drawn when the application was pending, its remedy to correct any such defect or oversight in the handling of the application was to have applied within reasonable time for a reissue of the patent. No such application for reissue was filed, hence a dedication to the public of all which was not defined in the claims of the patent has unquestionably occurred.

> *Ex parte Roberts* (Comrs. Dec. 1887, p. 61). *Ex parte Mullin & Mullin* (50 O. G., p. 837).

But the difficulty of *now* giving claim 1 a broad interpretation, an interpretation broad enough to include, as the packing element, any yielding packing, is that it will render the claim invalid and void, in view of the prior state of the art, *as developed in this suit*, though not as developed in the Patent Office proceedings before the patent was granted. If we eliminate from claim 1 the letter M as a limiting feature the claim will then read as follows:

> 1. The partially threaded plug B, headed pin N N′ extending through said plug, *and the yielding packing*, arranged between the head N′ and the inner end of the plug, in combination with each other, and with the gun A, arranged as shown.

And so read, the claim would cover yielding packings of any kind without limitation as to ma-

terial, and would be anticipated, for instance, by the prior French patent to Mauduit, No. 91107, of 1870.

III.

The interpretation of claim 1 that was urged upon the court below, and which that court apparently adopted under the adroit and ingenious argument of counsel, is not in accordance with the established rule in the interpretation of patents, as set forth and applied in hundreds of cases.

An elastic and accommodating rule of construction or interpretation has been applied to claim 1, which will enable that claim to adapt itself automatically to varying conditions. The court was asked to construe the words "the yielding packing M" in the claim as including just so much, and no more, of the packing ring of De Bange as is present in the structures used by the Government; that is to say, the asbestos and tallow portion of the packing and not the other portions thereof, namely, the thin copper shells M^2 M^2 and the strong brass shells M^3 M^3. These shells are as much a part of the packing M as is the asbestos and tallow material. There is not the slightest suggestion anywhere in the patent that the asbestos and tallow material could be used alone, without the copper and brass shells, and indeed it is very apparent that it could not be so used. The shells are necessary to preserve the form of the packing and to make the joint tight.

We have shown that the letter M in the phrase "the yielding packing M" does not refer to the asbestos and tallow alone, but to the packing ring *as a whole*. The letter M′ refers specifically to the asbestos and tallow. Thus the specification (p. 17) says:

> The *body M′* of this packing is of asbestos saturated with tallow, etc. * * * It is inclosed between two thin shells M^2 M^2 of copper, one fitting the *body M′* on the inner and the other on the outer side, and nearly incasing the entire packing. But the *body M′* and the copper M^2 are then inclosed between two strong shells of brass M^3 M^3. The entire packing *thus made* is adapted to maintain its form, etc.

Again, in claim 3:

> The packing M, having a tough yielding interior M′, etc.

The indispensableness of the metal shells is further shown by the following quotations:

> The expansion from one or both causes is sufficient to press the exterior of the *copper* M^2 tightly against the interior of the gun, thus effectually preventing any leakage of gas (p. 18).

Again:

> If there be any considerable adhesion of the packing M to the interior of the gun, it may be difficult to draw the screw-plug endwise. (Mid. p. 18.)

In this last quotation, " the packing M " is referred to precisely as it is in claim 1. The adhesion of it to the interior of the gun can only refer to the adhesion of its inclosing metal shells, for those are the only parts of the packing that come into contact with the bore of the gun. The asbestos and tallow composition never touches it.

According to the rule of interpretation pressed upon the court below by the appellee, if the Government had used in its packing asbestos and tallow, plus the thin copper shells, but without the strong brass shells, the claim would automatically adjust itself to that combination; or if the Government had used a packing composed of asbestos and tallow, plus the copper shells and the brass shells, then the claim would automatically adjust itself to that combination also, and so on through as many permutations or combinations as may be made of the asbestos and tallow composition, the copper shells, and the brass shells.

Such a rule of interpretation has often been exploited, but always with disastrous consequences to the patentee. It violates fundamental principles. It renders the claim *elastic* and *indefinite* where it should be *certain*. It makes the legal construction of the claim depend not upon its language, read in the light of the preceding specification, to which it directly refers, but upon what subsequent inventors may have developed and used. In the case at bar it enables the appellee to set up the Government's structure invented and used

years after De Bange's patent was issued, and then ask the court to read into the claim just enough to make the claim include that structure. If a claim could thus be tortured and twisted to suit every exigency, it would be senseless for the statute to require a patentee to define his invention by claims.

IV.

There was a time in the history of the law of patents when all that an inventor had to do to get a patent was to make and file in the Patent Office a written description of his invention, leaving it to the courts to ascertain the metes and bounds of the protection to which he was entitled; but since the act of 1836 he has been required to do more than this. He has been required to "particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery." (Rev. Stat. U. S., sec. 4888.) This is not only for his protection, but also, and mainly, for the protection of the public. It requires him to designate the limits of his invention. It enables the public to tell precisely what the inhibited ground is upon which it is unlawful to trespass.

It matters not what the real invention of the patentee may have been. It is he who is called upon to define it, and if he characterizes it as narrow and circumscribed when in fact it is broad and generic, he, and not the public, must suffer for it. On the other hand, if he defines it as broad, when in fact it is narrow, he is equally bound. The claim

must have a fixed meaning. It can not mean one thing to-day and another to-morrow.

The language used by this court in *McClain* v. *Ortmayer* (141 U. S., 419) is here very pertinent:

> While the patentee may have been unfortunate in the language he has chosen to express his actual invention, and may have been entitled to a broader claim, we are not at liberty, without running counter to the entire current of authority in this court, to construe such claims to include more than their language fairly imports. Nothing is better settled in the law of patents than that the patentee may claim the whole or only a part of his invention, and that if he only describe and claim a part, he is presumed to have abandoned the residue to the public. The object of the patent law in requiring the patentee to "particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery" is not only to secure to him all to which he is entitled, but to apprise the public of what is still open to them. The claim is the measure of his right to relief, and while the specification may be referred to to limit the claim, it can never be made to expand it. Thus in *Keystone Bridge Co.* v. *Phoenix Iron Co.* (95 U. S., 274, 278) the manufacture of round bars flattened and drilled at the eye, for use in the lower cords of iron bridges, was held not to be an infringement of a patent for an improvement in such bridges where the claim in the speci-

fication described the patented invention as consisting in the use of wide and thin drilled eye bars applied on edge. In delivering the opinion of the court, Mr. Justice Bradley observed: "It is plain, therefore, that the defendant company, which does not make said bars at all (that is, wide and thin bars), but round or cylindrical bars, does not infringe this claim of the patent. When a claim is so explicit, the courts can not alter or enlarge it. If the patentees have not claimed the whole of their invention, and the omission has been the result of inadvertence, they should have sought to correct the error by a surrender of the patent and an application for a reissue. * * * But the courts have no right to enlarge a patent beyond the scope of its claims as allowed by the Patent Office or the appellate tribunal, to which contested applications are referred. When the terms of a claim in a patent are clear and distinct (as they always should be) the patentee, in a suit brought upon the patent, is bound by it. He can claim nothing beyond it."

Similar language is used in *Railway Co.* v. *Mellon* (104 U. S., 112) in reference to a patented locomotive wheel. Other cases to the same effect are *Merrill* v. *Yeomans* (94 U. S., 568); *Burns* v. *Meyer* (100 U. S., 671); and *Sutter* v. *Robinson* (119 U. S., 530).

A reference to a few cases will clearly show that the appellee's effort in this case to have the court

read into his claim just enough to hold the Government is entirely without warrant.

In *Santa Clara Val. Mill, &c., Co.* v. *Prescott* (102 Fed. Rep., 501) the patentee endeavored to import into a claim an element which was not expressed therein, which the Circuit Court of Appeals for the Ninth Circuit would not allow.

The claim was as follows:

> In a band-saw mill, the upper band-wheel shaft, in combination with independent vertically movable bearings in which the ends of said shaft are separately mounted, and automatic adjusting mechanism applied to each of the bearings of said shaft, substantially as and for the purposes specified.

In treating this claim the court said (p. 505):

> The object of the claim in a patent is to publish to the world the precise nature of the invention which the patentee seeks to protect. He can not demand that there shall be imported into it an element which is not there *distinctly stated or necessarily implied.* What was there in the appellee's patent to apprise Wilkin, who invented the mill which was used by the appellant, that one of the elements of the appellee's claim was the location of the point of support in a vertical line beneath the movable bearing? Upon what theory is the appellee to be permitted to select *one* from the various features of his device as the same is presented in the drawings and specification, and to say that that, and not some other, is an element of his combina-

> tion? Either the claim is to be construed in accordance with the language in which it is expressed, unaided by the drawings and specifications, or it is to be circumscribed by the drawings and specifications. If the latter, then it is to be narrowed to the construction which is so set forth, *and not to any one specified portion thereof*. We are not at liberty to say that the location of the point of support of the movable bearings is a portion of the claim, and that the form of the levers and the construction of the fixed supports and their relation to one another are not.

(Italics ours.)

So in this case. What was there in the De Bange claim 1 to apprise the Government that the asbestos and tallow material was the element designated by the phrase "the yielding packing M" of that claim, and that the copper shells and the brass shells were not also included by that phrase, since the letter M in the specification designated the whole packing ring, including the asbestos and tallow, the copper shells and the brass shells, while the letter M′ designated the asbestos and tallow composition, the letters M^2 M^2 the copper shells, and the letters M^3 M^3 the brass shells?

In *McCarty* v. *Lehigh Valley R. Co.* (160 U. S., 110) there was involved a patent for an improvement in car trucks containing the following claims:

> 3. The lower bar G, having flanges Q, turned up on its ends, in combination with the upper bar F, having its ends bearing

against said flanges, the guide plates P, bolted to the ends of said bars under the same, the stops or blocks M, inserted between bars F and G, near their ends, and the pillars H also interpose between said bars, as stated.

4. The upper bolster, composed of the bent bar F, straight bar G, and interposing column M, in combination with the plates P, secured beneath the bars F, G, at their ends, and notched or grooved on their sides at a, to receive the columns B of the side irons, substantially as and for the purpose set forth.

An effort was made to have certain features, and not others, read into these claims, in order to save the claims and cover the defendant who used the omitted features, but this court, speaking through Mr. Justice Brown, disposed of the matter as follows:

> These claims differ from each other principally in the fact that the flanges Q, at the ends of the lower bar G, as well as the pillars H, constituting elements in the third claim, are not found in the fourth; while the fourth describes the plates, P, which are stated in the third claim to be "bolted to the ends of said bars under the same," as "secured beneath the bars F, G, at their ends, and notched or grooved on their sides at *a*, to receive the columns B of the side irons, substantially as and for the purpose set forth." There is no suggestion in either of these claims that the ends of the bolster rest upon

springs in the side trusses, although they are so described in the specification and exhibited in the drawings. It is suggested, however, that this feature is to be read into the claims for the purpose of sustaining the patent. While this may be done with a view of showing the connection in which a device is used, and proving that it is an operative device, we know of no principle of law which would authorize us to read into a claim an element which is not present, for the purpose of making out a case of novelty or infringement. The difficulty is that if we once begin to include elements not mentioned in the claim, in order to limit such claim and avoid a defense of anticipation, we should never know where to stop. If, for example, a prior device were produced exhibiting the combination of these claims plus the springs, the patentee might insist upon reading some other element into the claims, such, for instance, as the side frames and all the other operative portions of the mechanism constituting the car truck, to prove that the prior device was not an anticipation. It might also require us to read into the fourth claim the flanges and pillars described in the third. This doctrine is too obviously untenable to require argument.

In the case at bar the French patent to Mauduit of 1870 has been produced, showing the broad combination of claim 1, including a yielding packing of rubber, whereupon the claimant asks that claim 1 be construed as limited to a packing of asbestos

and tallow in order that the Frenchman's device may not be held an anticipation; but, when the Government insists that if any part of the patentee's packing M is to be read into the claim all parts of said packing must be likewise read in, the appellee objects, because to read all the parts of the packing in would be to release the Government, which has never used all the parts. It is this changing and shifting of the scope of the claim to suit exigencies that Mr. Justice Brown had in mind when he said that "this doctrine is too obviously untenable to require argument." (See also *Day* v. *Fairhaven & W. Ry. Co.*, 132 U. S., 98; *Howe Machine Co.* v. *National Needle Co.*, 134 U. S., 388.)

In *White* v. *Dunbar* (119 U. S., 47) the claim in controversy read as follows:

> As as improvement in the art of preserving shrimps in metal cans, the mode of preventing the discoloration of the shrimps, which consists in interposing between the metal can and the shrimps an enveloping material for the shrimps, which is not itself capable of discoloring the shrimps, and then sealing the can, and subjecting the same and its contents to a boiling process, substantially as described.

The patentee contended, in order to save the claim and hold the defendant, that the claim should be limited to the use of a lining of textile fabric, which was the enveloping material that was described in his specification, but this court held that

was not permissible, that the claim was broad and could not be narrowed to cover that which had been described in the specification.

Mr. Justice Bradley, speaking for the court, said:

> Some persons seem to suppose that a claim in a patent is like a nose of wax, which may be turned and twisted in any direction by merely referring to the specification, so as to make it include something more than, or something different from, what its words express. The context may, undoubtedly, be resorted to, and often is resorted to, for the purpose of better understanding the meaning of the claim, but not for the purpose of changing it and making it different from what it is. The claim is a statutory requirement prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms. This has been so often expressed in the opinions of this court that it is unnecessary to pursue the subject further. (See *Keystone Bridge Co.* v. *Phoenix Iron Co.*, 95 U. S., 274, 278; *James* v. *Campbell*, 104 U. S., 356, 370.)

In *United States Repair and Guar. Co.* v. *Assyrian Asphalt Co.* (183 U. S., 591) the claim involved was as follows:

> The method of repairing asphalt pavements, which consists in subjecting the spot

> to be repaired to heat, adding new material, and smoothing and burnishing it, substantially as described.

The patentee contended for an interpretation of the claim that would limit it to a "blast of heat" or a "a strong blast of heat," instead of the unqualified "heat" mentioned in the claim.

This court, speaking through Mr. Justice McKenna, said:

> It is not within the rightful power of the courts to enlarge or restrict the scope of patents which by mistake were issued in terms too narrow or too broad to cover the invention, however manifest the fact and extent of the mistake may be shown to have been.

So, in the case at bar, the appellee would have the yielding packing M construed to mean a yielding packing of asbestos and tallow, *though the claim does not call for such a packing.* If the patentee were really entitled to a claim limited to a packing of asbestos and tallow, it did not make such a claim, and, as Mr. Justice McKenna says, "it is not within the rightful power of the courts" to *now help* it.

In *Frederick R. Stearns & Co.* v. *Russell* (85 Fed. Rep., 218) the Court of Appeals for the Sixth Circuit, speaking through Judge Taft, said:

> To imply as elements of a claim parts not named therein for the purpose of limiting its scope, so that it may be accorded novelty, is

contrary to a well-settled rule of the patent law.

The learned judge then went on to cite and quote from *McCarty* v. *Railroad Company* (160 U. S., 110), from which we have above quoted.

In *Paul Boynton Co.* v. *Morris Chute Co. et al.* (87 Fed. Rep., 225) the Circuit Court of Appeals for the Third Circuit had before it a patent for an improvement in inclined pleasure railways, the first claim of which read as follows:

> 1. In an inclined pleasure railway, in combination with an inclined way and track which is located or erected near a body of water, a boat-shaped car or toboggan adapted, when it reaches the foot of the incline, to enter and float forwardly on the water, substantially as described.

It was attempted to read something into this claim to narrow it and cover the defendant, but the court, speaking through Judge Dallas, said:

> It is, however, contended that this claim, though expressly inclusive of any "boat-shaped car or toboggan adapted * * * to enter and float forwardly on the water," should be construed to be exclusive of any such device which is not also "adapted to prevent the shipping of water and splashing of occupants." It is insisted that this limitation may be found in the specification and drawings, and that from them it may be imported into the claim. But we can not accept either branch of this proposition. We are not at liberty to add to or vary the

claim by reference to other parts of the patent, nor is there anything contained in it upon which the amendment desired (if allowable) could reasonably be founded. If interpretation of the claim were requisite, the specification might, of course, be resorted to for the purpose of arriving at a better understanding of its meaning, but this may not be done "for the purpose of changing it and making it different from what it is." (*White* v. *Dunbar,* 119 U. S., 47, 7 Sup. Ct., 72.) We are asked not to construe an ambiguous claim, but to engraft upon a perfectly plain one a restrictive qualification, which the patentee wholly omitted to " particularly point out" when he applied for his patent, and which it is proposed shall now be inserted only because the exigency of the appellant's case demands it. Authority to do this has not been vested in the courts. " The claim is a statutory requirement prescribed for the very purpose of making the patentee define precisely what his invention is, and it is unjust to the public as well as an evasion of the law to construe it in a manner different from the plain import of its terms." (*White* v. *Dunbar, supra.*) The words " substantially as described " do not warrant the insertion of an additional element in the claim. The combination, as there defined, does not include any provision against splashing, and by no reference to the context can the requirement that an applicant shall " particularly point out and distinctly claim " his invention be evaded.

In *Penfield* v. *C. & A. Potts & Co.* (126 Fed. Rep., 475) the Circuit Court of Appeals for the Sixth Circuit was called upon to construe the claim of a patent for a clay disintegrator, reading as follows:

> 6. In a clay disintegrator, the combination with a cylinder A, having a series of longitudinal grooves, of the scraping bars *c* adjustably secured in said grooves for the purpose specified.

An attempt was made to get the court to read into the claim certain features of the machine that were described in the specification, but the court, speaking through Judge Lurton, said (p. 483):

> The sixth claim, on the other hand, omits any particular means for holding the clay against the shredding bars of the cylinder of the patent. Now, we are urged to read into this claim the features of a clay disintegrator, which are described in the specifications, such as the frame, the inclined or swinging plate, or the equivalent of such plate and mechanism for operating same, so that the claim when thus filled in will include all the operative parts of a clay disintegrating machine as elements. We know of no authority for reading into a claim features which have been omitted, although shown in the specifications, and none which would justify us in suffering such an enlargement of this claim for the purpose of increasing the damages justly recoverable for the infringement of the patented portions of the infringing ma-

chine. We may, beyond doubt, look to the specifications and drawings for the purpose of understanding the claims, or that we may see whether the device is useful or operative, and sometimes for the purpose of limiting a claim to the particular device described, but we may not enlarge a claim by including therein elements which are not claimed as such. In *McCarty* v. *Lehigh Valley Railroad Co.*, 160 U. S., 110, 16 Sup. Ct., 240, 242, 40 L. Ed., 358, the court was urged to read into a claim certain features which were described in the drawings and specifications. In dealing with this, Justice Brown said:

"While this may be done with a view of showing the connection in which a device is used, and proving that it is an operative device, we know of no principle of law which would authorize us to read into a claim an element which is not present for the purpose of making out a case of novelty or infringement."

In *Stearns* v. *Russell* (85 Fed., 218, 29 C. C. A., 121), it was sought to read into a claim the several parts of a larger combination. The claim read, "in a mechanism for dipping pills, a dipping bar," etc. Judge Taft, speaking for this court, said:

"To imply as elements of a claim parts not named therein, for the purpose of limiting its scope, so that it may be accorded novelty, is contrary to a well-settled rule of the patent law."

In *Westinghouse Air Brake Co.* v. *New York Air Brake Co.* (119 Fed., 874), an effort was made to

have the Circuit Court of Appeals for the Second Circuit to read into a claim certain features not therein expressed, but the court, speaking through Judge Townsend, said:

> Complainant contends that the secondary equalizing port 32 is the port of particular importance, for various reasons, and therefore that the court should so interpret the claim as to hold that it covers port 32 instead of port 36. But while this court may resort to the language of the specification for the purpose of interpreting the claim, it can not read into such claim elements not specifically covered thereby, especially where to do so would be to *contradict* the clear and definite statement in the specification. When the terms of the claim are clear and distinct, the patentee can not claim anything beyond for the purpose of establishing infringement.

In *American Bell Telephone Company* v. *National Telephone Mfg. Co.* (109 Fed., 976) Judge Brown, of the First Circuit, was asked to read into a claim certain qualifications which were not expressed in it. He disposed of the matter as follows (p. 997):

> To save these claims it is necessary, not to explain them by resort to the specification, but to engraft upon them restrictive qualifications which the patentee omitted to point out. This may not be done for the purpose of changing it and making it different from what it is.

In *Gerard* v. *Diebold Safe and Lock Co.* (61 Fed., 209) the Circuit Court of Appeals for the Fifth Circuit thus expressed itself through Judge Locke as to the binding character of claims on the patentee:

> In every patent the language of the claim, specifications, and grant should be so clear, distinct, and positive as to leave no question of what was asked and granted, nor should it require a careful, nice, and labored investigation to ascertain whether one may not have trespassed upon the rights of the patentee. It is the duty of an inventor to use language sufficiently plain and explicit in his application to denote clearly what he asks for; and where he fails to do so, and the language of the grant follows that of the application, and is thereby misleading to the general public, he should gain no profit from such defective statement of that to which he considers he is entitled. When the language of both application and grant is so positively and directly declaratory of what was asked and granted as we find it in this case, we consider that it would be going beyond a safe rule to extend the operation and protection of the patent further. If appellant had originally made application for an "improvement in locking device for safes, jails, and other similar structures," which he now insists upon claiming that his invention covers, the public would have had notice of his claim, but the language conveyed no such idea.

In *Bracewell* v. *Passaic Print Works* (107 Fed., 457) Judge Coxe, of the Second Circuit, stated the rule as follows:

> The rule deducible from the following authorities is that the specification must clearly describe and distinctly claim the invention. The public is entitled to know what the patent is for, and it is an invasion of the rights of the public to change the claim by construction so that it covers processes which previously were free to all. *Whether this injustice be attempted by broadening or limiting the claim is immaterial.* Where a claim is clearly void the court can not make it valid either by importing into it elements not mentioned therein or by construing the language of the claim to cover elements not clearly described in the specification. After claiming a process so broadly that it is met by the prior art and after the process practiced by following a certain formula has gone into general use, the patentee can not so limit his claim as to cover that formula unless it be clearly described in the specification and the claim be susceptible of an interpretation including it.

(Italics ours.)

From these citations it will be seen that when the appellee asked the court below to read into claim 1 the asbestos and tallow composition, and at the same time omit from the claim the copper shells and the brass shells, it invoked a rule of interpretation that has been uniformly condemned by this

court and by the various Circuit Courts of Appeals that now stand as courts of last resort in patent cases.

Of course the true mode of arriving at the proper construction of the claim is to consider the circumstances in which it was drawn. If this claim 1 were written for a broad claim, it was doubtless not intended to be limited to a "packing of asbestos and tallow," because nothing was cited by the Patent Office against it demanding such a limitation. If, on the other hand, the patentee had intended the claim to be limited to the asbestos and tallow material and not the copper and brass inclosing shells, it should have so phrased the claim as to accomplish that result, but, as Mr. Justice Brown remarked, "it is not within the rightful power of the courts" to now help him.

To allow the appellee to set up the device used by the Government, and then ask that a construction be put upon the claim just broad enough to cover that device, and not broad enough to render the claim unpatentable and anticipated by a prior art, would be to allow a shifting of the language of a claim in a way that has never before been permitted, but which, on the contrary, has received the universal condemnation of the courts.

The liberal rule that is sometimes applied to patents for pioneer inventions may not be invoked in this case. De Bange's invention was in no proper sense a pioneer one (Rec., pp. 19–28). The

whole generic combination of gun, partially threaded breech plug, headed pin, and a yielding packing of some sort, such as rubber, was admittedly old at the date of his invention. He merely invented a different form of packing ring and substituted it in the old combination for the old form of packing ring that had theretofore been used. Plainly he was a mere *improver,* not a pioneer. The fact that the appellee, in its endeavor to maintain this suit, now seeks to have the claim limited to a combination in which an asbestos and tallow material alone is used, thus impliedly conceding that all other materials were old in the art and free to be used, is the very best evidence that the invention is not a *pioneer* one.

Before the Government entered upon the manufacture of its appliances it had a right to assume that the claim was a broad one and invalid, or that it was so narrow as to not cover what it proposed to use in its ordnance.

We can see no reason why, as against the Government, a rule of interpretation should be applied that would not be applicable in a suit against an individual. On the theory that Claim I is a broad one this suit should have been dismissed because of the invalidity of the claim, and on the theory that it is a narrow one the suit should have been dismissed because the Government does not infringe it.

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CLAIMANT'S CROSS APPEAL.

The cross appeal is chiefly directed to the question of the amount of the judgment rendered by the court below and to certain suggestions for changes in the findings of fact which are embodied in appellee's motion for remand and its brief in support thereof, filed April 18, 1910. The contention of the Government with reference to the questions therein raised has been fully set forth in the brief filed April 25, 1910, in opposition to appellee's motion to remand. This court deferred consideration of the motion until the case could be heard upon its merits. It is not deemed necessary to present extended argument in relation to this cross appeal for the reason that we believe the determination of the questions raised by the Government's appeal will effectually dispose of this case. While we contend that the court below erred in rendering judgment for any amount whatever, yet should this judgment not be reversed the amount thereof, being in the nature of a special verdict found by the Court of Claims, can not be altered or enlarged under the well-established practice of this court. (See *District of Columbia* v. *Barnes*, 179 U. S., 146, and other cases cited in the Government's brief in opposition to motion for remand.)

The Government made a written request on the court below for certain findings of fact and insisted upon their materiality as part of the findings in this case, but the court refused or neglected to sustain the Government in this request. Should this court,

upon consideration of the motion to remand for change of or addition to the findings of fact, decide to call for further findings, then we respectfully request that in the order there be embodied direction to the Court of Claims to include in its additional findings the facts which the Government requested to be found and which are not in the record. (*United States* v. *Driscoll,* 131 U. S., Appendix CLIX.) These facts are set forth in appendices A and B following this brief.

We think the record taken as a whole does not contain sufficient evidence to justify the conclusion that there arose or existed an implied contract in fact between the Government and the appellee herein.

Furthermore, that the gas check used by the Government is so radically different from the unpatented De Bange gas check and from the gas check covered by appellee's patent that the use of the gas check on the Government's breech-loading cannon does not constitute an infringement of claim 1 of the patent in suit.

We therefore ask that the judgment of the Court of Claims be reversed with directions to dismiss the petition.

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Appendix A.

Defendant's substitute request for (original) finding VI.

After the receipt of the Chadwick letter of April 27, 1883, inclosing a description of De Bange's invention, and after the receipt of the model of said invention sent with the Chadwick letter of July 5, 1883, the ordnance officers of the Navy Department constructed a facsimile of said model, with which numerous experiments were made at the proving ground at Indianhead. These experiments showed that the De Bange invention as represented by the model was not satisfactory or practically serviceable for use in heavy ordnance guns of the United States, and it was not until after the pad of asbestos and tallow had been inclosed within the solid steel rings substantially in the manner proposed by Davis, who was an employee of the Navy Department, that the gas-check pad was adopted into service use by the Navy. While the pad of asbestos and tallow inclosed within the solid steel rings of the Davis type was susceptible of some use, said gas-check pad was not a satisfactory or reliable device to meet the necessary requirements of the service conditions in our heavy ordnance guns until the method of inclosing said pad of asbestos and tallow within steel split rings (the diameter of the rings being slightly larger than the diameter of the seat of the gas check so that they would always be in contact) was adopted. These steel split rings were substantially of the form and type proposed

by Gerdom, an employee of the United States Army, on duty at the Sandy Hook proving ground.

The development by the United States Army of the gas check which was adopted into use in that service was the result of experiments made by the ordnance officers of the Army, independent of and without relation to the knowledge of the De Bange gas check, which had been conveyed to the Navy Department through the Chadwick letters and the model, but from independent knowledge of said gas check, derived by Army officers from information secured from abroad as well as from both foreign and American publications, containing a description and drawings of the De Bange invention which were in the possession of the War Department.

The experiments made by the Army with the De Bange gas-check pad showed substantially the same difficulties and uncertainties of operation as had been shown by the experiments made by the Navy Department. It was not until the pad of asbestos and tallow was inclosed within solid steel rings of the Davis pattern, which was known to the Army as well as the Navy, that it was adopted into service use in the Army. The use of the pad of asbestos and tallow inclosed within the solid steel rings of the Davis type was not satisfactory and reliable for the highest service requirements, and it was not until the adoption by the Army of the split steel rings for inclosing the pad, which were substantially of the Gerdom pattern, that the device became efficient enough for necessary service requirements. The pad of asbestos and tallow was not adopted by the Army or Navy into service use and no guns were supplied with said pad until

it had been inclosed first with the solid steel rings of the Davis pattern, which were later supplemented by the steel split rings of the Gerdom pattern.

The gas checks employing a pad of asbestos and tallow inclosed either between solid steel rings or between steel split rings, as above described, since their adoption and use by the United States in its heavy ordnance (5-inch caliber and upward) have been of one or the other of the above-mentioned types ever since about 1885, and no gas checks of other types have been since used in the service of the United States. The gas checks above mentioned have been sometimes commonly called in the service and mentioned in the official reports of the Secretaries of War and Navy as the "De Bange type of gas check."

The obturators employed by the United States during the period of this suit were provided with asbestos and tallow inclosed within a canvas envelope and protected by steel rings (instead of by tin cups or by copper envelope and brass shells). Some of said obturators so used by the defendant followed substantially what is commonly known as the Davis construction and were used under an arrangement with Davis, but the greater number followed substantially what is commonly known as the Gerdom construction, and were used under an arrangement with Gerdom (p. 640).

The particular form of packing ring embracing the composition of asbestos and tallow inclosed within the copper shells and the brass shells has never been adopted into use in this country by the defendant or otherwise.

The United States Government has never disputed the title of Col. De Bange as inventor of the said invention described by him and communicated in the Chadwick letter of April 27, 1883, or as shown and described in the patent to De Bange, No. 301220, but the officers of the United States authorized to bind it by contracts have never admitted that the gas check adopted into service by the United States, either in the Army or Navy, was the same as the De Bange described or patented invention, and those officers have refused to pass upon and have declined to settle either the claim of Col. De Bange for the alleged "infringement" of his patent, No. 301220; or the claim of the Société Cail, the present claimant, for the alleged use of the device shown and described in said patent to De Bange. (See the following references to the record:)

Alger, p. 91, As. 32–3; pp. 95–6, XAs. 1–4; p. 218, As. 2–11; pp. 780–2, As. 7–9; p. 786, A. 18; p. 787, A. 22.

McNutt, p. 120, As. 10–42; pp. 125–7, XAs. 17–33.

Smith, pp. 818–19, As. 3–4; p. 825, A. 2; p. 826, A. 2.

Birnie, p. 827, A. 3; p. 828, As. 5–6; p. 834, XA. 15.

Heath, p. 843, A. 9; p. 845, XA. 22.

Hoffer, p. 853, A. 3.

See correspondence between De Bange and the Navy Department, through the State Department (filed by defendant on January 29, 1909).

See also letters of claimant's attorneys to, and the replies of, the Secretaries of War and Navy, set forth on pp. 76–79, as set forth in Finding VIII.

Appendix B.

DEFENDANT'S ADDITIONAL REQUEST FOR FINDINGS OF FACT.

Prior to the letter from Lieut. Commander Chadwick, dated April 27, 1883, sending a description of the so-called "De Bange invention," and prior to the letter from said Chadwick, dated July 5, 1883, forwarding a model of said invention, and even prior to the publication by the United States of Ordnance Notes No. 292, dated April 20, 1883, containing a full description of the De Bange invention, with illustrations thereof, the ordnance officers of the United States Army had knowledge of the De Bange invention from the following sources: In 1880 (p. 834, XA. 15) or 1881 (p. 820, A. 4) Capt. (now Gen.) Smith, United States Army, while on ordnance duty in charge of the work of gun construction in the Ordnance Office, War Department, received information concerning the De Bange invention through a French manual, an official publication of the French Government, referring to the field artillery service in France, which was given to him by Col. Birnie, United States Army, on his return from Europe in 1880 (p. 834, XA. 15) or 1881 (p. 820, A. 4). He also received information concerning the said De Bange invention through a report from Col. Crispin, constructor of ordnance, who had just returned from abroad (p. 818, A. 3). On page 107 of the Getty Board report (see defendant's Exhibit Smith No.

1, which is made a part herewith) appears a letter from Col. S. Crispin, dated May 10, 1882, giving a description, accompanied by drawings, of the De Bange gas check (p. 820). The drawings mentioned by Col. Crispin are referred to as plate 11 of Appendix 1 of said report. (See also Birnie, RA., 1-4, p. 834.) There was also in the possession of the War Department, bearing the stamp "Received February 10, 1883," prior to the date of either of the Chadwick letters, a bound copy of Giornale di Artiglieria e Genio, 1881, part 11, an Italian monthly publication, which contains, on page 572, an article on the French artillery material from 1878 to 1880, continued, in which the De Bange obturator is described and a drawing of the same in detail, but not dimensioned, shown. The number of the plate is part 2, 58a, figure 12a. A tracing on linen made from the figure 12a, part 2, plate 58a, of the publication above designated, together with a translation from the text of the same (being defendant's Exhibit Hoffer No. 2), is made a part hereof.

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In the Supreme Court of the United States.

OCTOBER TERM, 1911.

THE UNITED STATES, APPELLANT,
v.
SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL. } No. 209.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, appellant,
v.
THE UNITED STATES. } No. 210.

MEMORANDA AND ADDITIONAL NOTES RELATIVE TO PATENT QUESTIONS, PRESENTED IN THE APPEAL BY THE UNITED STATES.

The title of the patent in suit, No. 301220, is "Breech-loading ordnance." That is, the patent relates to a complete cannon or piece of ordnance, which includes the gun proper and the mechanism for closing its breech or rear end.

Whatever invention De Bange may have made at any time, it seems clear that the invention which is set forth in his patent No. 301220 contains other things than a plastic pad or a yielding packing. The

patent in suit sets forth a combination of three moving parts in combination with a gun formed and arranged, as described in the specification and shown in the drawings.

One of these elements is a yielding packing; but the yielding packing is not the whole invention disclosed in the patent or embodied in the claims.

Appellee has seen fit to rest its case in the court below upon the alleged infringement of claim 1 of the patent in suit, which is a combination claim.

As shown by the file wrapper and contents of the patent in suit, which reveals its history in the Patent Office (rec., pp. 14–16), De Bange sought in his claim 3 of the original application to cover the packing by itself, but to this the Patent Office objected and said (rec., p. 15):

> Claim 3 is for a species of packing—a distinct invention—which must be covered in a separate application.

From this it seems evident that the "yielding packing M" is merely one of the elements of the combination recited in the first claim, and is not the whole invention.

Appellee endeavored in the court below to impress the idea that the pad or packing of asbestos and tallow was *the invention*, and it appears from the opinion of the Court of Claims that this contention was accepted, notwithstanding the language of claim 1. The court said (rec., p. 64):

> Every description of the patent in either the specification or claim imports in terms the predomination of the one central idea of a

> yielding packing composed of asbestos and tallow. *It is the invention;* without its presence the device fails; with it the device succeeds. The details of construction are of minor importance. * * * The court is of the opinion that *the invention* described by the language of the claim was the yielding pad of asbestos and tallow. [Italics ours.]

And again (rec., p. 65):

> It is urged with much persistency that the rejection of the claim as first specified, by the Patent Office, *precludes a claim for a patent covering a distinct species of packing.* It is to be observed in this connection that the claimant did not introduce into his amended claim any new element or eliminate any old one. *Claim 1, the only claim in issue in this proceeding,* remained substantially the same. * * * The yielding packing was designated by the letter "M" in claim 1 when originally presented to the Patent Office. *This description of the real invention* continued to be employed throughout the entire proceedings, and Finding I discloses that it is now the same. To hold otherwise, claim 3, a detail of construction, containing nonessential elements, must be read into claim 1. Both claim 1 and claim 3 construed together indicate an identity of invention, *claim 1 being a specification of the real patent* and claim 3 a specification of construction and utilization. [Italics ours.]

From the foregoing it should be apparent that what the court below has done in effect is to disregard the other elements recited in the combination

of claim 1 of the patent in suit and to give the patentee the credit of an invention for the yielding pad or packing of asbestos and tallow alone, without reference either to the details of its construction recited in the specification or the existence of the other elements cooperating with this element recited in the combination claim.

If it be true that the "real invention" of the patent in suit was the yielding pad or packing of asbestos and tallow, without reference to the construction of its enclosing features, and without reference to its cooperation with any other elements in combination to effect a result desired, then it seems clear that the application was not properly handled on behalf of the inventor in the Patent Office. Because if such be the case, the attorneys handling the application, instead of trying to obtain a combination claim, should have accepted the suggestion of the Patent Office that "Claim 3 is for a species of packing—a distinct invention—which must be covered in a separate application," and thereupon made a separate application embodying the element of the yielding pad or packing of asbestos and tallow as a separate and distinct invention. This court is of course familiar with the well-established rule of patent law, which has been recognized and ably stated in the following language:

> When an applicant claimed the various elements of a street-washing machine in combination and it appears that the novelty, if any, was in the nozzle used, *Held*, that "If appellant

> has made an improvement upon the nozzle of the prior art he is entitled to a patent in the use of his invention, but he is certainly not entitled to a patent on a new combination merely because he has improved a single element of that combination."
>
> (In re Ratican, 162 O. G., 540; also In re McNeil, 20 App. D. C., 294.)

But this was not done in the matter of De Bange's application, and it is *now too late* to cure such oversight or omission. The appellee has contented itself with securing in claim 1 a combination claim, and it must stand or fall by reason of such action.

Claim 1 of the patent in suit reads as follows:

> The partially threaded plug B, headed pin N N′ extending through said plug, and the yielding packing M, arranged between the head N′ and the inner end of the plug, in combination with each other and with the gun A, arranged as shown, to allow the pin to be driven rearward and compress the packing, as herein specified.

The combination of elements forming the mechanical structure recited in this claim may be divided as follows:

First, the partially threaded plug B.

Second, the headed pin N N′, extending through said plug.

Third, the yielding packing M, arranged between the head N′ and the inner end of the plug.

Fourth, the gun A.

All of these parts being combined with each other and with the gun, and arranged so that the pin with

its head when driven rearward will compress the packing.

The first two elements of the combination are clearly shown in the drawings of the patent and marked in the several figures, the first with the letter B and the second with the letters N and N′. As clearly shown in fig. 1, the head N′ has a stem or pin N, which extends rearward through a hole in the center of the plug B. The rear face of the head N′ lies parallel to the front face of the plug, and at a distance from it, thus leaving an annular space between the two of substantially rectangular cross section.

Another or third element of the combination, namely, "the yielding packing M," occupies the annular space between the head N′ and the plug B, so that when the head is forced rearward by the explosion, the yielding packing M will be compressed and expanded radially and forced against the inner surface of the bore of the gun, so as to prevent the escape of gas.

It will be noted that this *third element of the combination* is referred to by the single letter M. In order to know just what is meant by that reference it will be necessary to go back to the specification and to the drawing. (Rec., pp. 17–18 and 20.) From both of these we find that the thing referred to as a "yielding packing M" is a ring made up of *five* different parts, consisting of the inner "yielding mass" marked M′; the "two thin shells M^2 M^2, of copper," and the "two strong shells of brass M^3 M^3." *All of these several parts* going to make up the *whole,* and clearly shown in figs. 7 and 8.

The only passages in the specification and *first claim* of the patent in suit which refer to the characteristics of the *packing* used in the structure set forth in the patent are the following:

Specification, page 1, line 88 (rec., p. 17):

> At the moment of the discharge this head moves backward, compressing a relatively soft and expansible packing ring, M, behind it.

Specification, page 1, line 91 (rec., p. 17):

> The body M′ of this packing is of asbestos saturated with tallow, and affords a sufficiently yielding mass with the required capacity for enduring heat and for withstanding the very strong compressive force to which it is subjected by the discharge.

Specification, page 1, line 97 (rec., p. 17):

> It is enclosed between two thin shells, M^2 M^2, of copper, one fitting the body M′ on the inner and the other on the outer side, and *nearly encasing* the entire packing. [Italics ours.]

Specification, page 2, line 1 (rec., p. 17):

> Both the body M′ and the copper M^2 are then enclosed between two strong shells of brass M^3 M^3.

Specification, page 2, line 3 (rec., pp. 17–18):

> The entire packing *thus made* is adapted to maintain its form, but to allow a small amount of radial expansion sufficient to pack the joint tightly against the escape of gas. This expansion is due to two causes—the tapering form of the front end of the pin N, which acts on the

> interior of the packing, and the powerful compression received from the head N′. The expansion from one or both causes is sufficient *to press the exterior of the copper* M^2 tightly against the interior of the gun, *thus* effectually preventing any leakage of gas. [Italics ours.]

In claim 1, line 2 (rec., p. 19):

> The yielding packing M.

From the patent in suit, and particularly from the passages just quoted, it seems clear that the *packing ring M*, mentioned in the specification, and the "yielding packing M," mentioned in claim 1, refer to and represent one and the same thing. It will also be particularly noted that the passages from the specification above quoted describe in detail just how the packing ring M is made, and of what material the different parts of the ring are composed, and the shape of those parts; and in order that it may be made perfectly clear as to how this ring is formed, it is shown detached from all the other parts in figs. 6 and 7 of the patent drawings. Fig. 6 is a face view of the ring, while fig. 7 is a cross section taken through the axis of the ring. This ring taken *as a whole* is referred to by the letter M in the specification, and the three parts of this ring are referred to as M′, M^2, and M^3. The inner portion of the ring marked M′ is made of "asbestos, saturated with tallow." The outer edge, as well as the inner edge of the asbestos and tallow portion M′, is held within the copper shells M^2 M^3. It will be noted that the edges of the copper shells do not come together upon the opposite faces of the

asbestos portion M′, but they "nearly" encase the packing M′, as stated in the specification. The third portion of this ring, M, consists of "two strong shells of brass M^3 M^3." These are clearly shown in fig. 7, one covering each face of the ring, and covering the space between the edges of the copper shells M^2 M^2. From this construction it will be seen that the "yielding mass," forming the interior of the ring and marked M′, is entirely enclosed within the copper portions M^2 and brass portions M^3, and that the brass portions or shells M^3 cover the joint or space between the edges of the copper shells M^2 M^2. *All of these five parts*, taken together, namely, the "yielding mass M′," the "two thin shells M^2 M^2 of copper," and the "two strong shells of brass M^3 M^3," form the "relatively soft and expansible packing ring M."

From the foregoing it, therefore, seems clear that when the Court of Claims so construed claim 1 of the patent in suit as to attach chief consideration and importance to *that element* of the claim consisting of the "yielding packing M," and in effect disregarded the *other elements* recited in this combination claim, it fell into a serious error in holding that the yielding packing ring constructed as described and shown in the patents to Davis and Gerdom and as used by the Government, was an infringement of claim 1 of the patent in suit. An examination of the construction and operation of this element as disclosed in the Davis and Gerdom patents will clearly show that it not only is not constructed like the yielding packing M

of the De Bange patent, but that it operates differently, and is in essential respects a different structure from that of the patent in suit. We contend that the Government by the use of the gas check employed in its Army and Navy service has not infringed claim 1 of the De Bange patent as interpreted by the Court of Claims, because the particular gas check element of said claim and patent, has not been employed in the combination of elements embodied in the structure used by the Government.

A combination is an entirety, and if one of its elements is omitted the thing claimed disappears. Every part of the combination claimed is conclusively presumed to be material to the combination. A patentee makes all parts of a combination material when he claims them *in combination* and *not separately*. He can not, therefore, show his invention to be broader or narrower by construction, to prevent anticipation or to assert infringement. (*Walker on Patents*, secs. 176, 181, 182, 186, 339, and 349; *Case* v. *Brown*, 2 Wall., 320; *Derby* v. *Thompson*, 146 U. S., 476, 482; *Wright* v. *Yuengling*, 155 U. S., 47; *McClain* v. *Ortmayer*, 141 U. S., 419, 425; *Hubbell* v. *United States*, 179 U. S., 77, 82; *Water Meter Co.* v. *Vesper*, 101 U. S., 332; *Fay* v. *Cordesman*, 109, U. S., 408; *Amer. Can Co.* v. *Hickmott, &c., Co.*, 137 Fed., 86.) And when the alleged infringing device omits from its construction and operation one or more of the elements, as claimed in the patent in suit, or embodies one or more elements in addition to those, as claimed

in patent in suit, the allegation of infringement must fail of establishment unless the claim can be saved by invoking the doctrine of mechanical equivalents. (*Knapp* v. *Morss*, 150 U. S., 221; *Boyden Power Brake Co.* v. *Westinghouse*, 170 U. S., 537; *Adams Elec. Ry. Co.* v. *Tindell Co.*, 77 Fed., 432; *Nat'l, &c., Co.*, v. *Interchangeable, &c., Co.*, 106 Fed., 693.) The doctrine of mechanical equivalents cannot, however, be successfully relied upon in this case, because a comparison of the construction and operation of the yielding packing element of the patent in suit which is recited in the combination of Claim I, with that of the yielding packing elements of the Davis and Gerdom patents used by the Government, clearly shows that not only is the construction of this yielding packing element essentially different, but its operation is different, and is accomplished by different members or portions going to make up the whole element in the respective patents.

From the particularity with which this yielding packing element is described in the specification of the De Bange patent, and from the history in the Patent Office of the application for that patent, it is insisted that the proper interpretation of claim 1 is that it is limited to the structure actually described and shown in the patent, or the mechanical equivalent thereof, and that the element of the yielding packing recited in the combination in claim 1 is *the same element* as that described and shown in the patent as M.

If claim 1 is not held to be limited to the combination, with the other elements, of the yielding packing element M as described and shown in the De Bange patent, but is so read as to include with those other elements, broadly, any yielding packing element, then said claim is clearly anticipated by the prior art, to which the court's attention is now invited.

Chambers United States Patent No. 6612 of 1849: This patent relates to breech-loading cannon in which the breech plug is formed with an interrupted screw in the breech as well as upon the plug, so that the plug may be inserted by pushing it straight into the breech and then locked in the position by giving it a partial turn on its own axis. The obturation is obtained by a conical part of the breech plug coming in contact with a conical seat at the rear end of the bore of the gun. The plug, with the interrupted screw detached from the gun, is shown in fig. 3 of the drawing.

While this patent does not set forth the entire combination recited in claim 1 of the patent in suit, it shows that a "partially threaded breech plug" was known in ordnance more than 30 years prior to the application for the patent in suit.

Schenkl United States Patent No. 9943 of 1853: This patent also relates to breech-loading ordnance, and the breech is connected to the barrel of the gun by an interrupted screw, which is shown in fig. 10 of the drawing, where the two parts of the cannon are

shown in line with each other, but separated as they would be just prior to the breech plug being pushed into the breech.

While this patent does not contain all the elements of the structure recited in claim 1 of the patent in suit, it shows that the "partially threaded" breech plug was old long prior to the application for the patent in suit.

Joslyn United States Patent No. 13507 of 1855: This patent relates to breech-loading firearms, and particularly to a form of obturator having a yielding packing arranged between a movable head and the inner end of a breech plug, so that when the movable head is driven rearward the packing is compressed and expanded against the walls of the bore of the gun. Referring to the drawing, the yielding packing consists of two rings marked G and H, which are placed one in front of the other, the rings being slightly conical on the outside, so as to fit a conical chamber at the rear end of the bore of the gun; and the rings are conical on the inside to fit the conical head of the pin E. The pin E fits loosely into a hole in the breech plug D. The pin is normally pressed forward by a coil spring back of it, and is held from being pushed out of the breech plug entirely by a screw in the breech plug, whose point enters a slotted hole in the side of the pin E. The rings G and H are each cut at one point of their circumference so as to readily expand when the conical head of the pin is forced into them. These rings, as well as the pin, are shown detached in fig. 2 of the drawing, and

all of the parts are shown in their proper relation for firing in fig. 1. At the moment of firing the pressure of the gases acts upon the front face of the head of the pin E, driving it backward. And the specification says that—

> It necessarily follows that the coned head of the pin must cause the rings to expand, and consequently to fit tight to both the inside of the barrel and outside of the cone head of the pin, effectually preventing all escape of air or gas toward the breech, and causing the explosive force to be more intense than in ordinary breech-loading firearms.

This patent shows a construction in which there is a breech plug, a headed pin extending through said plug, and a yielding packing arranged between the head and the inner end of the plug in combination with each other and with a gun, to allow the pin to be driven rearward and compress the packing. While the yielding packing of the Joslyn patent is not identical with that of the patent in suit, yet it is one form of yielding packing, and responds fully to the language of claim 1 when broadly construed in respect thereto. The only element of the combination in claim 1 not found in the Joslyn patent is "the partially threaded plug," and this is shown elsewhere to be old in the art.

Clement United States Patent No. 14,949 of 1856: This invention consists in providing breech-loading firearms with india-rubber packing, which will compress and fill perfectly the interior of the barrel when there is an explosion in the same, thereby making it air and gas tight. Fig. 1 clearly illustrates the

structure, being a sectional view through the axis of the gun, showing the parts in their proper position for firing, and showing in dotted lines the position of the breech mechanism when it is open for the purpose of introducing the charge. A represents the barrel of the gun and B the breech plug. D and E show the obturator, and these parts are shown detached in fig. 3. The obturator consists of a yielding packing, E, which is described in the specification as being of india rubber. It is in the form of a ring whose outer surface is conical in both directions, one of the cones being designed to fit a conical seat at the rear end of the bore of the gun, and the other to fit a conical seat in the breech plug. A headed pin, D, passes through the center of the ring, the head of the pin entering the bore of the gun, and the stem of the pin extending through into the breech plug. The pin has a free longitudinal movement rearward, and is prevented from falling out by the point of a screw fixed in the breech plug, which enters a slot in the lower side of the pin D. The operation of the device, as stated in the specification, is as follows:

> The pressure on the head of the pin D will compress the rubber and cause the breech to be air and gas tight, thereby securing the whole force of the powder against the ball, also preventing the working parts from becoming foul, which causes them to stick.

Comparing the structure of the Clement patent with the structure of the patent in suit, it will be seen that both contain a breech plug, this element being

marked B in both patents. Though there is some slight difference in the manner of securing the plug in the breech of the gun, yet these plugs act in substantially the same manner to close the breech of the gun and resist the backward pressure of the gases, and to that extent they are equivalents of each other. Both forms of breech plug were old before the date of the Clement patent, as is shown by the U. S. Chambers patent and the U. S. Joslyn patent, above presented.

Both structures also contain a headed pin extending through the breech plug. That of the Clement patent is marked D, while that of the patent in suit is described as N N′. In the Clement patent the pin D extends only part way through the breech plug B, but is free to move rearward under the influence of the pressure, and is held from moving forward by the set screw F entering into the slot in the stem D. Whether the pin extends entirely through or only part way through the breech plug, it acts in precisely the same manner when forced rearward by the pressure of the gases; hence the headed pin D of the Clement patent is substantially the same thing as the headed pin N N′ of the patent in suit.

In both structures there is also found a yielding packing arranged between the head of the pin and the inner end of the plug, in combination with each other, and with a gun, and arranged so as to allow the pin to be driven rearward and compress the packing.

In the Clement patent this yielding packing is described as being an india-rubber ring, and is

marked E, while in the patent in suit it is simply described as "the yielding packing M" or as "a relatively soft and expansible packing ring M."

If claim 1 of the patent in suit be taken in even a moderately broad sense, it seems that the structure of the Clement patent responds to the language of this claim. While claim 1 of the patent in suit calls for "the partially threaded plug B," and the Clement patent shows a hinge breech plug, both forms of breech plugs were known prior to either of the patents, and both are shown in the prior art combined with the headed pin and a yielding packing, and all three of these parts combine with a gun to operate in the same manner in closing the breech of the gun and making a gas-tight joint at that point. Of course, if claim 1 of the patent in suit is held to be limited to the description in the specification of the construction of each of the elements recited in said claim, then the Clement patent does not respond to the claim. But when claim 1 is so limited it does not read upon the structure used by the Government.

Bailey English Patent No. 907 of 1861: This patent illustrates a breech plug, a movable head, and a yielding packing, combined with each other and with a gun, and arranged so that the head, when being driven rearward by the pressure of the gases, compresses the packing so as to make a gas-tight joint at the breech of the gun. The front end of the breech plug, with the movable head and yielding packing, are shown assembled together but detached from the

other parts in fig. 3 of the drawing, which is a section through the axis of the breech plug. In fig. 9 the complete breech plug is shown in its proper position in the breech of the gun at the time of firing. As shown in fig. 3, the breech plug is marked B, the front end of which is reduced in diameter so as to receive the movable head I, which is in the form of a ring sliding upon the reduced end of the plug and held in position against forward movement by the screw L, entering the forward end of the plug. The yielding packing, which lies between the movable head I and the end of the breech plug, is formed of three parts—first, a ring of yielding material, described in the specification as "an elastic washer, H," lying directly back of the movable head I; second, a cup-shaped ring, marked G, made of thin metal, the sides of the cup overlapping the yielding ring H and the forward edge extending over onto the outer edge of the movable head I and the bottom of the cup resting against the rear side of the yielding ring H and sliding freely upon the reduced end of the breech plug B; third, another ring of yielding material, marked K, and described as "the elastic washer at the back of the cup." The rear face of this yielding ring bears against the front face, or shoulder, of the breech plug B. When the discharge occurs the pressure on the steel washer I forces the elastic washer H into the thin cup or nozzle G, thereby expanding the cup or nozzle and compressing the elastic washer K so as to cause it to increase in diam-

eter, and in this manner the breech is effectually closed.

Comparing the Bailey structure with that of the patent in suit, there will be found in each a breech plug B. In each there is a movable head, that of Bailey being marked I, and sliding upon a pin or forward extension of the breech plug B.

In each structure there is a yielding packing, arranged between the movable head and the inner end of the breech plug, in combination with each other and with a gun, and arranged so as to allow the pin to be driven rearward and compress the packing. In each structure the yielding ring is made up of several parts.

While the detail of construction of the yielding packing shown in the Bailey patent differs somewhat from that shown in the patent in suit, and while the mode of locking the breech plug is somewhat different as to detail, still the structure of the Bailey patent responds to the language of claim 1 of the patent in suit, if that claim is to be read in any but a very restricted sense. The operation of the breech-closing mechanism of the Bailey patent and that of the patent in suit is substantially alike. In both the pressure of the gases, acting upon a movable head, serves to compress the yielding packing and force it out radially against the bore of the gun, so as to close the breech gas-tight, and in each the central yielding mass is protected from the direct contact of the hot gases by a thin shell of copper or other suitable metal.

Richards English Patent No. 3478 of 1862: While this patent has not a partially threaded breech plug nor a movable head with a yielding packing between the head and the end of the plug, yet it has a yielding packing which is designed to be forced into a tapering space between the front end of the breech plug and the bore of the gun.

This patent is important here, as showing that fibrous material saturated with lubricating material had been proposed, as a yielding packing, for the obturation of breech-loading ordnance, and that the proposed use of *fibrous asbestos* saturated with tallow, in the patent in suit, was not new with De Bange.

Lindner English Patent No. 3275 of 1863: The chief feature of this patent consists in obtaining a tight joint by the power of the explosive gases being made to act upon a movable breech piece, which receives its pressure upon a fluid or elastic body hermetically enclosed inside the breech piece. This fluid or body distributes the pressure it receives from the gases and reacts upon a movable ring provided with a conical edge, which is forcibly pressed into a corresponding conical seat at the rear of the bore and forms a gas-tight joint. The greater the pressure and the greater the caliber of the gun, the tighter the joint will be.

In fig. 17 there is shown the rear end of a breech-loading gun. The breech plug, which is partially threaded, is shown at L, and the obturating device, taken as a whole, is marked H, and the left-hand end of it is shown partially entering the bore of the

gun. The obturating device is shown apart from the other pieces, and upon a larger scale, in fig. 7. The device operates as follows: The breech plug L, having been inserted and locked in position, the pressure of the explosion acts directly upon the face of the movable head Q, and forces it rearward. The rear end of the movable head acts directly upon the yielding material contained in the cavity, tending to compress it. This yielding material, in turn, acts upon the rear face of the movable ring P, forcing it forward and bringing its forward end *f* into direct and forcible contact with a conical seat formed in the rear end of the bore of the gun.

Comparing the structure of the Lindner patent of 1863 with that recited in claim I of the patent in suit, there will be found in each a partially threaded plug, the Lindner plug L being cut away in two sections, while that of the patent in suit has its thread cut away in three sections. This is simply a question of choice and involves no difference in operation.

Both structures have a movable head. That of the Lindner patent, at Q, bears directly upon the yielding packing and is guided in its motion by being inserted into the ring P.

Both structures contain the yielding packing. That shown in the Lindner patent is contained in the concave cavity of the plug H; it receives the pressure of the plug Q, and transmits that pressure to the ring P, which in turn is pressed against its seat in the breech of the gun. In both patents there is employed a

yielding mass, which may be exemplified by asbestos, and in both this yielding mass is employed as a means for closing the joint at the breech of the gun, so as to make it gas tight.

Unless claim 1 of the patent in suit be restricted to the exact detail of construction shown in the drawing of the patent and described in the specification, the Lindner patent of 1863 responds fully to the language of said claim.

Byrnes & Benjamin English Patent No. 3308 of 1863: The structure of this patent is most clearly shown in figs. 3 and 4. Figs. 9 to 14 show the obturating device detached from the other parts of the breech mechanism. This consists of a breech plug B, to the forward end of which is attached a headed pin *f*–F. Between the front end of the breech plug and the face of the head there is a yielding packing E. The pin fits into a hole in the center of the breech plug, in which it is free to move longitudinally to a limited extent, and is prevented from falling out by a pin *d*, extending downward through the wall of the breech plug and through a slotted hole in the inner end of the pin *f*. The headed pin, with the slotted hole in the pin, together with the yielding packing is shown detached from the other part in fig. 12. In fig. 4 all the parts of the breech mechanism are shown in the position which they would occupy when the breech is open ready to receive the charge. In fig. 3 the parts are shown in the position which they would occupy after the charge has been inserted, the breech closed and locked in position. In fig. 3 the

breech plug B, with the headed pin *f*–F sliding in it, and the yielding packing E between the head and the plug, are clearly shown.

Upon firing, the loose end piece of the conical plug is pressed backward upon the disk of soft metal, and thereby is made to expand the same to such an extent as to form a gas-tight joint all around against the sides of the conical seating. The specification states that the ring E is made of "any suitable soft metal," and the description of the operation shows that this soft metal is sufficiently yielding as that it will be compressed in the direction of the axis of the gun and expanded radially so as to be forced into close contact with the bore of the gun and thus make a gas-tight joint.

Unless claim 1 of the patent in suit is held to be limited to the exact detail of construction shown in the drawing and described in the specification, this Byrnes & Benjamin patent responds to the language of said claim, except that the breech plug is not "partially threaded," but is locked in position by other well known and equivalent means.

Williams Confederate machine gun.—This reference from the prior art consists of a certified copy of the original papers in the files of the Ordnance Department of the United States Army, showing a special order issued from the headquarters of the Sixth Army Corps at Danville, Virginia, May 1, 1865, "four 'Williams' guns—breechloaders, smoothbore," to which is attached a blue print of a drawing marked "Williams Confederate Machine Gun." "Gas check, full size."

This blue print represents the breech end of a gun with the breech plug inserted. Directly in front of the breech plug is a movable head, *b*, held in position by a screw, *a*, upon which it is free to slide rearward. The rear face of the movable head is made conical so as to fit a conical seat in a split ring, *c*, whose rear face bears against the front face of the breech plug. The evident operation of the device is, that upon the explosion, the movable head *b* will be forced rearward, its conical face being driven into the conical split ring *c*, thus expanding it so that its periphery will bear tightly against the bore of the gun and close the joint. The drawing does not show the means by which the breech plug was locked into position, but evidently some means must have been used.

Comparing the structure of this gun with claim 1 of the patent in suit, it seems that if said claim is to be considered in any but a very restricted sense it will be responded to by this Williams gun. In either case it is the moving head and not the pin which presses against the yielding packing and causes it to expand radially to close the joint. The yielding packing of the Williams gun is not of the same detail of construction as that illustrated in the patent in suit, there being no yielding mass of fibrous material between the moving head and the metallic ring which comes in direct contact with the bore of the gun, but in either case there is a yielding packing which is expanded by a movable head.

Chassepot United States Patent No. 60832 of 1867: The breech plug with its obturating device is shown

detached from the other parts in fig. 4. Fig. 2 shows a longitudinal section of the gun with the parts in the position which they would occupy after firing and before the breech plug is drawn back. The breech plug marked B has a hole through its center, and in this hole there slides a pin having a head *c*. This pin has a hole lengthwise through its center through which passes the needle which is used for igniting the powder. Between the rear end of the head *c* and the forward end of the breech plug there is a ring of yielding packing *a*, which, when the powder explodes, is compressed by the movable head *c* and expanded radially so as to come in contact with the bore of the gun and close the joint gas-tight. The specification describes this yielding packing as being made of India rubber, preferably in "three layers, intimately united and of different degrees of hardness, the middle layer being of great elasticity, but, at the same time, harder than the ordinary vulcanized rubber of commerce, the other two layers being of such hardness as to have no tendency to fly off and clog the other parts of the mechanism when the piece is fired."

When the charge is exploded the sliding cap or movable head *c* is pressed upon the rubber or yielding packing *a* with such force that the latter will expand radially and hermetically close the bore against the escape of gases.

Comparing the structure of this Chassepot patent with that recited in claim 1 of the patent in suit, there will be found in each a breech plug B, and in each this breech plug is introduced into the breech of the gun by

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rectilinear motion, parallel to the axis of the gun, and in each this breech plug is locked by giving it a partial revolution about its own axis. In each there is a headed pin extending through the breech plug. In the Chassepot patent this pin is marked C and its head *c*, and the pin slides freely in a hole formed in the center line of the breech plug. In each there is a yielding packing which is arranged between the head of the pin and the inner end of the plug, and they are combined with each other and with a gun and so arranged as to allow the pin to be driven rearward and compress the packing. Although these packings differ in the detail of construction, they are both yielding packing, and they are both used for the same purpose, namely, that of closing the joint at the breech of the gun, and they are both compressed and expanded radially by the pressure of the moving head in exactly the same way. Therefore, unless claim 1 of the patent in suit is closely restricted to the exact detail of construction shown in the drawing and described in the specification, said claim will be fully met by the structure set forth in the Chassepot patent.

Mauduit French Patent No. 91107 of 1870: This patent appears as an exhibit in the form of a certified copy from the bound volumes of the library of the United States Patent Office. A view of the patent drawings, showing the parts enlarged, has been mounted, and produced for use in connection with the argument and for the observation of the court.

From the drawing and description it appears that the breech of the gun A is open to the rear in the

usual way. A groove is formed in the bore of the gun at the breech end forming a shoulder against which the breech plug B presses when in its locked position. This shoulder is cut away at three different points of the circumference, leaving the shoulder intact at three intermediate points. The breech plug B, having its periphery made to fit the groove in the bore of the gun, has its periphery cut away at three points, leaving it intact at the three intermediate points. This construction enables the breech plug to be pushed into position when the full sections of the plug are opposite the cutaway sections of the shoulder formed in the bore of the gun. When the breech plug is pushed forward in a right line as far as it will go, it is locked by being given a partial rotation about its axis of one-sixth of a turn. The breech plug B has a hole through its center, through which extends a pin having on its forward end a head I. Between the head I and plug B there is a yielding packing ring, J, which, according to the description, is made of india rubber. Enclosing the yielding packing material there is a flanged ring, K, whose flange bears against the front face of the breech plug B and whose periphery extends over so as to cover the rear edge of the movable head I. The breech plug with its obturator is supported and manipulated by a stem which extends rearward and passes through a cylindrical sleeve marked E, which sleeve is free to turn within another sleeve, which latter is hinged to the rear end of the gun by the hinge pin in the bracket C, clearly shown in the upper left-hand figure of the drawing, which is

a section through the center line of the gun at right angles to the hinge pin. A rear view of the gun and its breech mechanism, clearly showing the hinge arrangement, is shown in the figure at the lower right-hand corner of the drawing. There are two hinges fixed to the sleeve E by which the sleeve and the breech plug may be turned in the locking and unlocking of the plug.

The explosion of the powder forces the piston I backward, compressing the yielding packing, J, causing it to expand radially and to press against the inner surface of the steel ring K, and pressing the latter with great force against the bore of the gun, making a gas-tight joint.

Comparing the structure of this Mauduit patent with that recited in claim 1 of the patent in suit, there will be found in each a partially threaded plug B, or its direct mechanical equivalent—that is, in each plug the parts which lock it are partially cut away at three points in the circumference, so that the plug can be pushed into position in a line parallel with the axis of the gun and locked by giving the plug a sixth of a turn about its own axis. In each structure there is a headed pin extending through said plug, and in each this pin extends entirely through the breech plug and is free to slide rearward through the plug and is held in position by a ring surrounding the outer end of the pin and bearing against the rear face of the plug.

In each structure there is a yielding packing arranged between the head and the inner end of the plug in combination with each other and with the gun,

arranged so as to allow the pin to be driven rearward and compress the packing. In each the yielding packing is composed of a yielding mass of material which is encased within a metal shell, which shell bears directly against the bore of the gun and is tightly pressed against it when the moving head is forced backward and compresses the yielding mass. In these two yielding packings the detail of construction is not exactly the same, nor is the packing made up of the same number of parts, there being only two in Mauduit while there are five in the patent in suit; but each is a yielding packing, and each serves to close the joint at the breech of the gun in substantially the same manner. Therefore, unless claim 1 of the patent in suit is held to be very closely restricted to the exact detail of construction shown in the drawing and described in the specification, the structure of the Mauduit patent responds fully to the language of said claim.

Felt United States Patent No. 159170 of 1875: This patent discloses a breech plug, a headed pin extending through the plug, and a yielding packing between the head and the plug, so arranged that when the head is moved backward by the pressure of the explosion the yielding packing will be compressed and expanded radially so as to close the joint at the breech. There are, in fact, two headed pins and two yielding packings in this structure concentric with each other and one behind the other, the first pin extending entirely through the second and the second extending entirely through the breech plug. The

breech plug is shown at M screwed into the breech of the gun A, as seen in fig. 1. In fig. 2 the breech plug, together with its moving heads and yielding packings, is shown detached from the rest of the gun. The first headed pin is shown at B with its head C. This pin passes loosely through the center of the pin G with its head H; the pin G passes loosely through the plug and is provided at its rear end with a nut L. The packing ring of yielding material is shown at O between the head of the first pin and that of the second; and a similar yielding material is shown at P between the head of the second pin and the front face of the plug.

When the powder is exploded it acts upon the movable head C to force it rearward and compress the packing O and cause it to expand radially and close the joint between it and the bore of the gun. The rearward pressure on the packing O may re-act upon the movable head H and force it rearward, thus compressing still more the yielding packing P back of it, thus making the obturation still more perfect, if necessary.

The structure of this Felt patent responds fully to the language of claim 1 of the patent in suit in every particular, except that the breech plug is fully threaded instead of being partially threaded, but it has been shown by reference to other prior art patents here, such as Chambers and Schenkl, that the interrupted screw was old in ordnance long prior to the Felt patent or the patent in suit.

In view of this patent, and the patents heretofore discussed, it would seem that if claim 1 of the patent in suit is to have any value or validity it must be restricted to the features of the mechanism shown in the drawings and described in the specification of the patent in suit, and can not be given a broad construction, or stretched to cover the structure used by the Government, as embodied in the Davis and Gerdom patents.

Respectfully submitted.

MALCOLM A. COLES,
U. S. Attorney.

○

upreme Court of the United States

OCTOBER TERM, 1915.

THE UNITED STATES,
Appellant,
vs.
No. [illegible]
OCIÉTÉ ANONYME DES ANCIENS ÉTABLISSEMENTS CAIL,
Appellee.

OCIÉTÉ ANONYME DES ANCIENS ÉTABLISSEMENTS CAIL,
Cross-Appellant,
vs.
No. [illegible]
THE UNITED STATES,
Cross-Appellee.

APPEALS FROM THE COURT OF CLAIMS.

RIEF FOR COMPLAINANT APPELLEE.

PHILIP MARING,
TIMOTHY H. MCELWEE,
Counsel for Complainant.

INDEX.

	PAGE
Part I., STATEMENT	1
Part II., BRIEF OF ARGUMENT	8
First. The De Bange Obturator	8
Development of the De Bange Obturator	15
The De Bange patent	16
A Striking testimony to the value of De Bange Gas Check	22
The Davis and Gerdom improvements	22
Other Gas Checks	24
Second. Jurisdiction of Court of Claims. The Doctrine of the Berdan Case	26
Correspondence between De Bange and American Minister, &c.	33
The Russell case	36
The Harley case	39
Other contentions of Government Counsel in regard to Jurisdiction	41
Third. Reply to Appellant's Criticisms of Claim 1	44
The "Narrow" Interpretation of Claim 1	44
The "Broad" Interpretation of Claim 1	50
Fourth. Compensation	58

Supreme Court of the United States.

OCTOBER TERM, 1911.

THE UNITED STATES, Appellant, vs. SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, Appellee.	No. 209.
SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, Cross-Appellant, vs. THE UNITED STATES, Cross-Appellee.	No. 210.

BRIEF FOR APPELLEE (CLAIMANT BELOW).

PART I.

Statement.

This is an appeal and a cross-appeal from the judgment of the Court of Claims. The action below was a claim for recovery of compensation for the use by the Government of the

United States of a patented invention, known as the "de Bange Obturator," or "de Bange Gas-Check." The said invention was covered by U. S. Letters Patent No. 301,220, granted July 1, 1884, to the claimant, a French corporation, as assignee of Colonel de Bange, a retired officer of the French army.

The Court below held that the dealings between the Government and the claimant were such as to create an implied contract under the law as defined by this Court in *United States vs. Berdan Arms Co.* (156 U. S., 552); that the invention as described and claimed in claimant's patent had been used by the defendant in all its cannon of five-inch calibre and upwards throughout the life-time of said patent; and that claimant was entitled to recover compensation for such use. Judgment was entered in favor of the claimant for the sum of $136,000.

The defendant appealed from the entire judgment; and claimant has taken a cross-appeal from so much of the judgment as fixed the award at the amount above specified, deeming that amount to be inadequate to compensate it for the value of the use of said invention.

The present brief is submitted on behalf of the claimant as "Appellee" in this Court, and is addressed to the issues raised by the defendant's appeal. A separate brief has been filed dealing with the question of amount of compensation.

The deBange obturator performs a function indispensable in breech-loading guns, to wit, the hermetic sealing of the breech at the instant of explosion of the powder-charge, so as to cut off the escape of gases to the rear. The deBange obturator came to the knowledge of the ordnance authorities of the government of the United States at the time (1883) when the change from the old muzzle-loading guns to modern breech-loading guns was under consideration. The great question to be decided in making that important change in the nation's armament was *the type of obturator to be selected.* The whole policy of the Government in the matter of big-gun construction depended upon the decision of that question.

Having heard of the deBange obturator (See Ordnance Notes of April 20th, 1883, Finding IV., Tr., pp. 32, 35), the Government, through its Naval Attaché, Commander Chad-

wick, sought and obtained from Col. deBange in person, a detailed description of the precise method of manufacturing his gas-check. This description, which was in Col. deBange's own handwriting, was transmitted to the Navy Department by Commander Chadwick with a letter from that officer dated April 27, 1883 (Tr., pp. 40–42), and its directions have been followed, in all essential particulars, in the construction of deBange obturators to this day.

Later in the same year (July 5, 1883) Commander Chadwick forwarded to the Navy Department a specimen of the deBange obturator (Tr., p. 42). This specimen was procured by "request" of the Government of the United States through regular official channels. In the meantime, to wit, June 12, 1883, deBange's application for patent was filed in the U. S. Patent Office, with an assignment to the claimant; and in due course the patent was granted, July 1, 1884 (Tr., pp. 14–19). The assignment was dated *March 23, 1883.*

By Act of Congress approved March 3, 1883, an official Board, known as the "Gun Foundry Board," was constituted. It was composed of eminent officers of the U. S. Army and Navy appointed by the President, and its duty (among others) was to investigate the entire subject of modern artillery, and to report on a plan—

> "for the manufacture of heavy ordnance adapted to modern warfare, for the use of the Army and Navy of the United States."

This Board, in its official capacity, visited claimant's works on August 29, 1883, and inspected the de Bange System of Ordnance. (Tr., p. 43, Finding V.). The official report of the Gun Foundry Board to Congress (H. Ex., Doc. No. 97, Forty-Eighth Cong.) shows that the Board was received by Col. de Bange in person. At page 82 of the official report is the record of a letter addressed to "M. deBange, director of the Societe Anonyme des Anciens Establishments Cail a Paris, acknowledging the courteous reception extended by them to the members of the Board" (See Petition, Tr., p. 1). Col. de Bange, in a letter to Secretary Tracy, dated August

16, 1891 (Tr., p. 45), says, apparently referring to the visit of the Gun Foundry Board: "I have seen at Paris many of your officers to whom I furnished without reserve all the information which they have asked of me."

Finding VI. (Tr., p. 43) states as follows:

> "About the year 1884 the ordnance officers of the United States began experimenting with the de Bange gas check. As the result of all the investigations and trials, the de Bange obturator was adopted by the United States military and naval authorities, and all its heavy ordnance (5-inch calibre and upward) have been of that type since about 1885.
>
> "Since the adoption of the de Bange gas check no gas checks of other types have been used in the service of the United States."

There is no question, and never has been, that claimant's assignor is the first and original inventor of the deBange gas-check. His claim as the original, first and true inventor of that famous invention has never been disputed. As between the Government and the claimant that fact is established beyond question by the circumstance that the obturator was adopted by the Government under the name "deBange obturator," and has been, for a quarter of a century, known by that name and none other. Finding VI. further states that—

> "the said invention has, ever since its adoption, been known in the service of the United States, as 'the DeBange gas-check,' and is described by that name in the official reports of the Secretaries of War and of the Navy."

In the year 1891 Colonel deBange addressed certain communications to the American Minister at Paris, Mr. Whitelaw Reid, and (at the latter's suggestion) to the Secretary of the Navy, Mr. Benjamin F. Tracy, in which he asked compensation for the use of his patented gas-check (Tr., pp. 43 and 45).

The U. S. Naval attaché, upon receipt of Col. deBange's

first communication, advised Mr. Reid to refer it to the Navy Department, and added this comment :

> " It is a fact that the obturator used in some naval guns is currently spoken of as the 'De Bange Gas Check.' I am unable to say to what extent this obturator may be an infringement on the rights possessed by Colonel de Bange " (Tr., p. 44).

Col. de Bange's communication was referred by the Secretary of the Navy to the Bureau of Ordnance, and was returned with a report of the Chief of that Bureau, Commodore Folger, in which he said :

> " The gas-check which has been adopted for the naval guns of 6-in. calibre and upwards resembles in certain features that described in United States patent No. 301,220 issued to Col. de Bange. It also differs from it materially in particulars which are original in this bureau.
>
> " I am not in a position to give an opinion as to the question of infringement, and have to suggest that the applicant refer the matter to the Court of Claims (Tr., p. 46).

On January 31, 1894, the claimant by its attorneys, presented to the Secretaries of War and Navy, respectively, a request for compensation for the use of the de Bange obturator. This request was again referred to the Bureau of Ordnance of the Navy, and was the subject of a report by Admiral W. T. Sampson, in which report that distinguished officer said that the gas-checks used in the Navy were constructed according to the Davis patent, No. 318,093, May 10, 1885, and added :

> " If, however, as the bureau believes to be the case, the above-mentioned (Davis) patent is only valid so far as it covers improvements upon the DeBange patent (No. 301,220, of July 1, 1884), then, so far as the latter patent is valid, the within claim for royalties, in the bureau's opinion, is a proper one and would be maintained by the courts."

And Admiral Sampson recommended that, if the DeBange patent were found on investigation to be valid, the War Department be consulted as to whether—

> " a definite sum, to be fixed either by a board or in some other way, should not be offered the claimants for the right on the part of the Government to use the device in question on all its guns " (Tr., pp. 51, 52).

This recommendation of Admiral Sampson was adopted and followed by the Secretaries of War and Navy, who accordingly referred the whole matter to the Court of Claims, as originally recommended by Commodore Folger in 1891.

The final disposition of the matter by the Secretary of the Navy (letter of Dec. 31, 1894), adopted verbatim by the Secretary of War, contained the following:

> " It appears that the matter is now in such a condition that it will in all probability involve not only questions arising under the patent issued to Colonel de Bange, but also those growing out of the claims and affecting the rights of other patentees. Under these circumstances the department is of the opinion that the full consideration and determination of these questions can be more certainly and equitably reached, and the rights of all the parties concerned, as well as the Government, more definitely ascertained and assured through the medium of a court of justice. It is therefore suggested that the necessary proceedings for the consideration and adjustment of the matter by the Court of Claims be instituted." (Tr. p. 52.)

Following this suggestion claimant on January 31, 1895, filed its petition in the Court of Claims.

Thus there was never a denial of claimants right to compensation on the part of the responsible officers of the Government. On the contrary, the claim when presented was referred for determination to the Court of Claims, and defendant *continued making and using deBange obturators to the full end of the term of the patent, leaving it to the Court of Claims to pass upon the validity of the patent, and to fix the amount of compensation to be awarded to the claimant.*

It would be difficult, we think, to conceive of a state of

facts which would more clearly establish the existence of an implied contract, according to the criteria defined by the decisions of this Court.

Practically the entire use of the invention by the Government occurred under a convention entered into by the Secretaries of War and Navy, whereby they virtually pledged the Government to pay such amount as might be awarded by the Court of Claims, if they found the patent to be valid. And we deem it proper to say to the Court that the facts in this regard were deemed by the able counsel for the Government, Mr. Charles C. Binney, who conducted the entire case up to final hearing in the Court below to be so clear, and the rule of law to be so well settled, that he admitted in his brief filed in the lower Court, the existence of an implied contract.

The Government brief below (Ct. Cls. Rec., p. 330), referring to the letters of the Secretaries of War and Navy, says :

> "Their letters (Rec. 76) would justify the Court in implying a contract in case the Court should conclude that the defendant's gas-checks were covered by the claimant's patent (Berdan Arms Mfg. Co. vs. United States, 156 U. S., 552)."

Other counsel, who succeeded Mr. Binney, took the ground that the doctrine of the Berdan case had been changed by this Court in the later Russell and Harley cases. Mr. Binney, who appeared for the Government in both the Russell and Harley cases, and who also was most intimately acquainted with the facts of the present case, deemed the latter to be indisputably within the doctrine of the Berdan case. Doubtless the Government is entitled to the ruling of this Court upon that question, if there be any question about it. We do not claim that the Government is bound by admission of Government Counsel, now no longer connected with the case, and we wish to gain no advantage from it further than the respect which this Court may deem to be due to the opinion of an able and conscientious lawyer, well known to this Court, who has made a special study of the jurisdiction of the Court of Claims, and has had a perfect acquaintance with all the facts which this Court is called upon to consider in reviewing the judgment of the Court of Claims in the present case.

PART II.

Brief of Argument.

In this part of the brief will be found, FIRST, an explanation of the patented invention and its importance; SECOND, a discussion of the jurisdiction of the Court of Claims, showing that they were warranted in taking cognizance of this claim as one founded upon an implied contract; THIRD, a reply to the criticisms of the patent contained in the Appellant's Brief, and FOURTH, a brief comment on the subject of compensation.

FIRST.

The De Bange Obturator.

The invention involved in this claim is one of world-wide celebrity. Probably there is none more famous in the entire field of modern ordnance. It lies at the very foundation of the offensive armament of the United States, having been employed, from the first adoption of breech-loading cannon, in *all* the guns of five-inch calibre and upwards, and in some guns of smaller calibre; in a word, in all guns that do not use fixed ammunition (Tr., p. 43, Finding VI.).

The great value of the de Bange obturator is recognized all over the world. Its practically indispensable character is set forth in official reports of the War and Navy Departments of the United States, in text books used at West Point and Annapolis, and in numerous technical works (Tr., p. 43, Finding VI.). To this day there is no known obturator that could be substituted for it in the type of ordnance ("interrupted screw" type) adopted by the United States for all its guns. It is used in every civilized country in the world except Germany, and would doubtless have been adopted there but for its French origin. It is fully conceded that Colonel de Bange, claimant's assignor, is the inventor of this famous mechanism, and that

the Government has used it throughout the entire lifetime of his patent (Tr., p. 43, Finding VI.).

By these facts alone the justice of the patentee's claim for compensation is placed upon unassailable ground. Beyond all question our Government has used claimant's invention and has derived enormous benefit from such use. Therefore, it only remains to be decided whether, under the laws of the United States as construed by this Court, claimant has a standing in the Court of Claims to recover, as upon an implied contract, the compensation to which it is undoubtedly entitled. There is no question of *right* to be decided, but only the technical question of *remedy*.

No meritorious defense has been presented. The contentions of the defendant-appellant, presented by the Brief of its counsel herein, are, concisely stated, as follows:

1st, that the dealings between the Government and the claimant are not such that a contract can be implied therefrom, but that, on the contrary,

> " the facts disclosed by the correspondence constituted *an infringement* or *tortious use* by the United States of the device alleged to be covered by claim 1 of the patent in suit " (Brief for the United States, p. 7, italics in original);

2d, that the deBange patent does not properly cover the particular form of obturator which the Government has used in its guns; but that the claim of the patent should be construed as being either *too narrow* to cover the obturator used by the Government (as argued on pages 51-57 of the brief) or *too broad* to be valid at all (as argued on pages 57-81 thereof).

The word " obturator " (a word borrowed from the French) signifies a device for sealing the breech of the gun, cutting off the escape of the gases of explosion in that direction. Those gases generate an energy so enormous as to be inconceivable to the mind. Expressed in figures it is given by engineers as from 30,000 to 40,000 pounds to the square inch (Tr., 32, Finding III.). The weakness of the breech-loading system of cannon lies in the *joint* between the breech-block and the gun, which joint is exposed to the maximum pressure of the highly

heated and exceedingly erosive powder-gases. It is absolutely necessary that the escape of these gases should be completely and instantaneously cut off; and it is also a necessity that this should be done *automatically*, or in other words, that the obturator should be so contrived that the power of the gases themselves should be utilized to cut off their own escape to the rear.

By the invention of Col. de Bange the problem of obturation (which was a problem awaiting solution for a score of years) was solved in simple and effective manner. Through the automatic functioning of the "plastic pad" of asbestos and tallow, the *rearward* pressure of the powder-gases is converted into a *radially expansive force* GREATER than that of the gases themselves, thus completely cutting off the escape of the gases. On the other hand, as soon as the projectile is discharged, the pressure on the pad is relaxed, and the breech-block may be instantly withdrawn for the purpose of reloading.

Ordnance experts have always preferred the French or "interrupted screw" system of fermeture (or closure) for breech-loading cannon; and this system depends for its efficiency upon the de Bange obturator. If there were no de Bange obturator there would be no interrupted-screw fermeture for high power guns.

The indispensable requirements of an obturator for cannon are stated in the United States "Ordnance Notes" No. 292, April 20, 1883 (Tr., pp. 32, 33, Finding IV.). After pointing out that "breech-loading artillery presents so many advantages that it would long ago have been universally adopted, had a really satisfactory breech-loading system been devised," and that "attempts were made in this direction three hundred years ago," the writer of those Notes proceeds to define "the *desiderata* of a perfect breech-loading system" as follows:

> "(1) That it should completely stop all escape of gas. This is self-evident. However good in other respects, any system which fails to fulfill the above condition fails in its primary object.
>
> "(2) That it should not be easily put out of order. This condition, too, is a *sine qua non*. It can only be said to be second in importance to the first condition. The fact is, that if the first be not fulfilled the second

is an impossibility. Nothing that can easily be put out of order through its own fault can ever be seriously entertained as part of a weapon intended for modern warfare.

"(3) That it should not weaken the gun. In order to stand a comparison with a muzzle-loading gun of the same weight, it is evident that the breech-loader should not be inherently weaker. Against bursting pressure there is no difficulty in securing an equality. It is in the longitudinal direction that most breech-loading systems fail.

"(4) That all parts exposed to wear should be capable of being readily and easily replaced. This is almost a corollary of condition (2). Without it the gravest inconveniences would soon be felt. A system which, under favorable conditions, may stand 200 or 300 rounds, but which then requires the gun to be returned to an arsenal to be again placed in a serviceable condition, is inadmissible. Spare working parts should be capable of being replaced on the spot.

"(5) Should be easy to work. Ease of working is essential to rapidity and continuity of fire and is one of the points in which a good breech-loader has a very great advantage over a muzzle-loader, especially when the gun and projectile become large and heavy.

(6) In order to fulfill the above it has been found by experience that no system is at all satisfactory in which the gas pressure of the fired charge does not tend to seal its own escape. What is required is that the greater the pressure the more complete and secure the closing. To be completely satisfactory the "obturation" as it is called, to borrow a term from the French, must be automatic, and not dependent of [on] any perfection of fit of the breech mechanism."

It will be observed that the very first requirement of a "perfect breech-loading system" is "*that it should completely stop all gas.*" It thus appears that the chief problem in the development of breech-loading cannon was the problem of OBTURATION. As appears from the foregoing and as found by the Court below, "the requirements to be met by the gas-

check of a large gun are of a very severe character" (Finding III., p. 32); but we deem it unnecessary to enlarge at this point upon them.

The Ordnance Notes of April 20, 1883, from which we have quoted above, contain also "the earliest reference to the de Bange System of obturation appearing in any publication in the United States so far as the evidence herein discloses" (p. 32, Finding IV.), that reference is found on page 35 of the Transcript in the following words:

> "In France, however, the DeBange method has been adapted for land service. In this a large mushroom-headed piece of steel is fitted to the block, the 'stalk' passing through it. (Plate 1). The mushroom head fits the bore tolerably closely, and between it and the face of the block, on the stalk is placed the 'obturator' pad. This consists of two plates of tin, strengthened at the edges by thin brass rings, and containing between them a ring of asbestos and grease, inclosed in a canvas bag and pressed between the tin plates into its proper shape by heavy hydraulic pressure. On firing, the head is pressed back by the gaseous pressure, and causes the pad to expand, tightly filling the bore, and completely sealing all escape of gas. The system taken as a whole appears from French accounts to be excellent. Conditions (1), (4), (5) and (6) appear to be perfectly fulfilled, and (2) and (3) as far as there is any present probability of their being fulfilled at all.
>
> "It is with regard to (2) and (5)—that is, non-liability, to be put out of order and to ease of working—that it appears to be better than the cup system. A single blow or dent on the cup or the copper ring at its seat would cause an escape of gas, and rapidly put the breech action *hors du combat* until both were replaced. The obturator pad may be, so we are told, battered without destroying its efficiency. The first round will restore it to shape, and that without allowing any escape of gas. With this latter method of closing all escape of gas, too, no great accuracy of workmanship or care in fitting is required. The cup

requires both to a very high degree. Its ease of working, too, is dependent on this, as well as thorough cleansing to avoid sticking in its seat.

"On the whole, then, we may conclude that a really satisfactory breech-loading system has been devised, and actually adopted in France. The chief and only defect, as far as we know at present, of this DeBange system is that the pad and mushroom head take up a large amount of room as compared with the Armstrong steel cup. In fact, the bore is shortened by exactly their united thickness. Taking all, however, into consideration, it does not appear that this advantage counterbalances the many advantages possessed by the DeBange gas check. It is impossible, within the limits of space available, to notice the many ingenious but useless methods of breech-loading which have from time to time been proposed. They all alike have failed under the necessities imposed by actual use on a large scale."

The "cup system" of obturator referred to in the above extract is that employed with the Krupp gun, used in Germany. We call attention to the manifest superiority of the de Bange system, and to the statement made of the many other systems devised up to that time that "they all alike have failed."

It will be observed that, from the very first, the device involved in this suit was known officially as "the de Bange gas-check." The ordnance authorities of this Government knew *before they adopted that device, that it was the invention of Col. de Bange;* and there has never been, from that day to this, any doubt or question on that point. The invention of this important device by Col. de Bange is a matter of well-known history.

Moreover, this published official reference to the invention of Col. de Bange was accompanied by a clear description of the construction of the device itself, that description being substantially identical with that contained in the specification of the de Bange patent (applied for in the same year, 1883, Tr., pp. 16-20). And the device, substantially as described in said Ordnance Notes, has been adopted and used by this Gov-

ernment from 1885 to the present time. The Court below has found as a fact herein as follows:

> "The United States Goverament has never disputed the title of claimant's assignor, Colonel de Bange, as the inventor of said invention; but, on the contrary, the said invention has, ever since its adoption, been known in the service of the United States as the 'De Bange Gas Check', and is described by that name in the official reports of the Secretaries of War and of the Navy" (Tr., p. 43, Finding VI).

This is an important fact as tending to establish the jurisdiction of the Court of Claims, according to the decisions of this Court.

It is further to be noted that, at the date of the publication of said "Ordnance Notes" (April, 20, 1883), which was only a few weeks prior to the application for patent by the claimant, our ordnance experts knew of the deBange device only by hearsay. They say "the system *appears from the French accounts* to be excellent"; and "The obturator pad may be, *so we are told*, battered without destroying its efficiency." But the authorities were diligent in following up this information. By April 27th, 1883, our naval attaché at London, Lieut. Com. Chadwick, had obtained from Col. deBange himself, and in his own handwriting, a detailed description of the de Bange gas check, accompanied by a complete specification of the precise method of making and using it (p. 40).

This description is such as would only be sought by a person *intending to manufacture the device.* It unmistakably shows an intention on the part of the Government officers to manufacture the deBange obturator, and a willingness on the part of deBange that they should do so. This is an incident of great importance, and we shall make further reference to it. Such relations and dealings as these between the Government and a patentee, followed by the actual adoption and use by the former of the latter's patented invention, give rise to an implied contract under the settled law of this Court.

A little later (July 5, 1883) Commander Chadwick, having procured a specimen of the de Bange obturator, transmitted the same to the Navy Department with a letter saying: "I

have the honor to forward herewith *a de Bange 'obturator'* which was kindly presented on request by the French minister of war." (Tr., p. 42).

Development of the de Bange Obturator.

Previous to the invention of Col. de Bange, numerous experiments had been conducted, extending over a period of many years (twenty or more), in the effort to discover and adapt a material capable of performing the office of an obturator. Most of those attempts were made with india-rubber in various forms and combinations. The results constitute a long history of repeated trials, first with one form and then with another, meeting always with encouraging results at first, but sooner or later ending in utter failure (pp. 28–31). As stated in Ordnance Notes quoted above, "They all alike failed." The fact in this regard is tersely stated in Finding II., as follows:

> "The evidence discloses that the above invention (rubber obturators) was not successfully applied or used in field guns or cannon of large calibre, and is not now so used" (p. 28).

The obturator of Col. de Bange is an exemplification of inventive genius in this respect among others, namely, that it involves *a contradiction of all* PRESUMPTIONS. One would naturally suppose, upon learning what is required of an obturator, that the requirements could only be met by an *elastic* material, such as india-rubber. For a great many years the efforts of those skilled in the art proceeded upon that supposition. But Col. de Bange conceived the idea that those requirements would be realized by the use of a material *plastic* and *non-elastic*.

In the "Memorial de Artilleria," quoted in Ordnance Notes above referred to, after stating some of the *a priori* assumptions against obturation "obtained by a substance *so devoid of elasticity* as a disk of asbestos and tallow," mention is made of the fact,—demonstrated experimentally,—that—

> "even after the compression of the disk and the tearing of the cloth of the apparatus, *all presumptions to the contrary notwithstanding*, it continues to work without

> great difficulty; and in view of the facts it must be recognized that, if the PLASTIC obturator does not resist the examination of a prudent critic, *it resists very well, which is more to the purpose, the firing of the piece under the most unfavorable conditions of service.*" (Italics ours. Tr., p. 37).

As appears from the foregoing citations, the essential characteristic of the deBange obturator, by which it is distinguished from every other system of obturation, consists in the fact that the operation of the device is effected by means of a packing which is "*plastic*," as distinguished from *elastic*. An *elastic* substance is one which, when flexed or compressed, tends to resume its original shape after removal of the strain. A *plastic* substance is just the reverse of that, namely, a substance which, when compressed or molded tends to retain the shape imparted to it by the compression. There is a broad principle of physics involved in this proposition which it would be interesting to discuss. But inasmuch as it is thoroughly established, and indeed conceded, that Col. deBange invented, reduced to practice, and demonstrated by extensive trials "under the most unfavorable conditions of service," "the PLASTIC obturator" (as it is often called), we need not dwell upon the principles of science involved in the invention.

The literature of the art of ordnance abounds in descriptions of the de Bange obturator, and of statements of its many and great advantages. A few of these are mentioned in Finding VII., to which we would direct the attention of the Court.

The De Bange Patent.

The de Bange obturator is clearly described and specifically claimed in the patent granted to claimant as the assignee of Col. de Bange, July 1, 1884 (application filed June 12, 1883). The specification is printed on pages 16–19 of the Transcript, and the drawing is reproduced on page 20. The specification says :

> "I have devised a system of packing placed in advance of the plug, and which is expanded by the force

of the explosion of the powder to make a tight joint to prevent the leakage of gas" (p. 16).

This is a clear and exact statement of the essential character and function of the invention.

The construction and operation of the obturator is thus described:

"A liberal hole in the line of the axis of the screw-plug B carries a stout sliding pin N, at the extreme front of which is a stout head, N^1. The portion of the body adjacent to the head N^1 is slightly enlarged. The head N^1 is adapted to receive the force of the powder at the discharge. At the moment of the discharge this head moves backward, compressing a relatively soft and expansible packing-ring, M, behind it. Certain portions of this ring will be distinguished, when necessary, by additional marks, as M^1 M^2. The body M^1 of this packing is of abestos saturated with tallow, and affords a sufficiently yielding mass with the required capacity for enduring heat and for withstanding the very strong compressive force to which it is subjected by the discharge. It is inclosed between the two thin shells M^2 M^2, of copper, one fitting the body M′ on the inner and the other on the outer side, and nearly encasing the entire packing. Both the body M′ and the copper M^2 are then inclosed between two strong shells of brass, M^3 M^3. The entire packing thus made is adapted to maintain its form, but to allow a small amount of radial expansion sufficient to pack the joint tightly against the escape of gas. This expansion is due to two causes—the tapering form of the front end of the pin N, which acts on the interior of the packing, and the powerful compression received from the head N′. The expansion from one or both causes is sufficient to press the exterior of the copper M^2 tightly against the interior of the gun, thus effectually preventing any leakage of gas."

The invention is aptly specified in claim 1 of the patent, which reads as follows:

> "1. The partially-threaded plug B, headed pin N N′, extending through said plug, and the yielding packing M, arranged between the head N′ and the inner end of the plug, in combination with each other and with the gun A, arranged as shown, to allow the pin to be driven rearward and compress the packing, as herein specified."

As we have already pointed out, the distinguishing feature of the invention is "the yielding packing M," described in the specification as "a relatively soft and expansible packing ring M"; "the body" of this packing being composed of "asbestus saturated with tallow," which "affords a sufficiently yielding mass, with the required capacity for enduring heat and for withstanding the very strong compressive force to which it is subjected by the discharge." It is this *yielding* packing M which gives to the entire combination of mechanism the character of an operative rnd efficient system of obturation.

The Court below, in their opinion, after reciting some of the undisputed facts, say:

> "It is almost inconceivable therefore how the court can, in view of the state of the art prior to the De Bange patent, arrive at any other conclusion than that the De Bange invention was in fact and in substance, a discovery of a distinct, new and novel system of obturation. No system of obturation prior to it had anticipated the use of a yielding packing ring of asbestos and tallow; repeated attempts at a substitute had failed, and the findings disclose its successful use and operation ever since."

Then, after quoting the specification, the Court further say:

> "Claim 1 is drawn with the same preciseness, and, in conjunction with Claim 3, covers *in toto* the details of the patent. The specifications and claims being addressed to those skilled in the art or science, only such precision and nicety was required as to enable such

> a class of persons to use the invention (Loom Co. v. Higgins, 105 U. S., 580). It is difficult to perceive how one skilled in the particular art or science of breech-loading ordnance could fail to instantly avail himself of the essential, the functioning, the indispensable element of the device described in the specifications and claim, to wit, 'the ring of asbestos and tallow.' Every description of the patent in either the specification or claim imports in terms the predomination of the one central idea of a yielding packing composed of asbestos and tallow. IT IS THE INVENTION; without its presence the device fails; with it the device succeeds. The details of construction are of minor importance."

Undoubtedly it was an invention of the very highest grade to discover and produce a composition of matter which was "sufficiently yielding" to perform successfully the extraordinary duty demanded of it in automatically, instantaneously and hermetically sealing the breech, and which also possessed all the properties needed for enduring the tremendous pressure, high temperatures, and destructive influences generated at the moment of explosion in the powder-chamber of a modern gun. The de Bange obturator issues unimpaired in usefulness from as many such ordeals as the gun itself will stand. In fact, if the pad should be deformed from any cause, *the very act of firing the gun* conforms it again to the seat of its lodgement. It is thus self-repairing (Tr. 47, Finding VII.). Very properly did the Court below say of this yielding pad. "*It is the invention;* without its presence the device fails; with it the device succeeds. The details of construction are of minor importance."

If there be among pre-existing devices anything presenting a superficial resemblance to the de Bange breech-mechanism (see Tr., p. 28, paragraph beginning, "Before the date of De Bange's invention," and three succeeding paragraphs), the resemblance is of the kind characterized by this Court in the *Richardson Valve Case*, in which the Court, speaking of certain prior devices, said:

> "Likenesses in them, in physical structure, to the apparatus of Richardson, in important particulars may

be pointed out; but it is *only as the anatomy of a corpse resembles that of a living being.* The prior structures never effected the kind of result attained by Richardson's apparatus, *because they lacked the thing which gave success.*"

Consolidated Valve Co. vs. Crosby Valve Co., 113 U. S., 157. Opinion by Mr. Justice BLATCHFORD.

The yielding pad, which is, in the language of the Court below, "the essential, the functioning, the indispensable element," requires to be covered by a suitable envelope of flexible material, such as cloth or metal foil, and to be enclosed between rigid metal fittings, as of brass or steel. It was shown by the undisputed proofs, and was found by the Court below as a fact, that these subordinate features of the device are susceptible of modification without changing the essential features of the device.

In the specification of the patent the envelope is described as being made of thin sheets of copper (copper foil). In the description furnished by Col. de Bange to Commander Chadwick, a cover of *cloth* is described. The yielding pad, with its envelope of cloth or other material, is enclosed between metal rings. These rings may be of any suitable metal, such as brass or steel. The patent specifies brass. Col. de Bange's description, given to Commander Chadwick, recommends laminated tin cups with rings of spring brass. The description in Ordnance Notes of April 20, 1883, mentions "plates of tin, strengthened at the edges by thin brass rings" (p. 35). Another description of Col. de Bange's experiments speaks of "a metallic split ring" (p. 30). These are variable details, the accessories being susceptible of modifications of various kinds; but the essential and invariable element is the plastic pad of asbestos and tallow, having the capacity to withstand all the destructive influences to which it is exposed, and of expanding radially under the action of the powder-gases with a pressure greater that that which the gases exert in trying to escape rearward.

The deBange obturators used by the defendant have had envelopes of canvas (instead of copper sheets as described in the patent) and were enclosed between rigid disks of steel (instead of brass, as described in the patent). This circumstance

is the warrant for a fancied distinction made in appellant's brief between the " patented " deBange gas-check, and the " unpatented " deBange gas-check. This imaginary distinction bears the burden of a large part of the argument of appellant's counsel (Brief for the United States, pp. 19–26). Counsel say that—

> —" the two things—the *unpatented* and the *patented* gas-check—are materially different in important and essential respects " (p. 20).
>
> " And this lack of identity between the structure of the device described by Chadwick and exhibited to the Gun Foundry Board, and the device of the patent in suit is *the very essence of the whole proposition* " (p. 26, italics in last quotation ours).

These assertions of counsel are contrary to the facts and are utterly without support in the Findings of the Court below.

The history of the art, the numerous official reports and publications, and the ordnance experts of the world, know of only *one* deBange gas-check, of which there are several varities, differing from each other only in minor and non-essential details. Moreover, the Court below found *as a fact*, which is conclusive here, that the differences above pointed out are of " minor importance." But counsel for the Government nevertheless say that the two things are " materially different " and that the lack of identity between them is " the very essence of the whole proposition." Counsel argues that the dealings which Col. de Bange had with the Government officers are to be ruled out of consideration herein on the ground that they related, not to the de Bange gas-check of the patent, but to another gas-check radically different therefrom. If, however, the device used by the Government is substantially the same as that described in the patent, operating on the same principle, and differing only in variable details, as found by the Court below, then the argument of counsel for the defendant falls to the ground for lack of support. Therefore, we shall discuss this proposition more fully in a subsequent part of this brief. It is sufficient at this point to say that claim 1 of the patent, which distinctly

specifies "the yielding packing M" in combination with the other necessary elements, is well drawn, and that it sets forth in apt terms the novel combination of operative parts known to ordnance experts throughout the world as "the de Bange obturator."

A Striking Testimony to the Value of the de Bange Gas-Check.

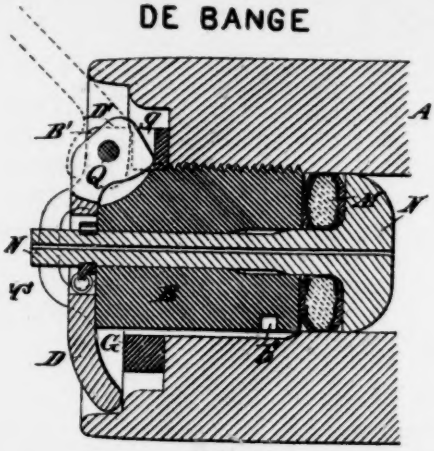
It is appropriate at this point to call attention to an important fact which, so far as we knew, is without parallel in the history of inventions in the field of armament. During the past thirty years inventive activity in that field has been intense, with the result that the construction of ordnance, and other war material, has been practically transformed. Yet amid all the changes that have been wrought, and in spite of the enormous increase of the powder-charge and consequent increase of pressure within the guns, the de Bange gas-check, with its characteristic yielding packing of asbestos and tallow, has remained unchanged. *It meets the exacting requirements of to-day as well as it met the relatively easy ones of thirty years ago.* A host of inventors of every land, working for well nigh a generation, has found nothing that is able to supplant it. A stronger testimony than this to the extraordinary merit of the invention could hardly be imagined.

The Davis and Gerdom Improvements.

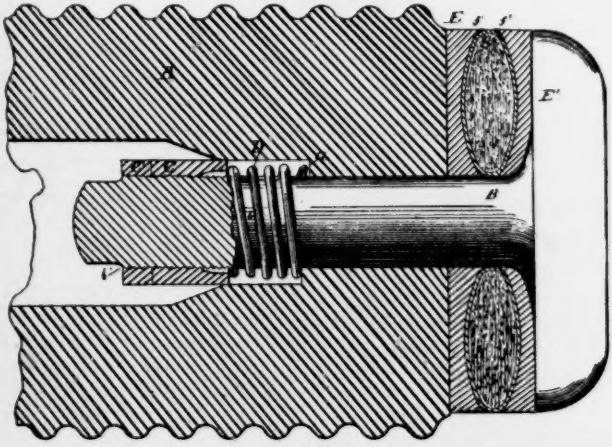
Subsequent to the issue of the de Bange patent two patents were granted for slight improvements thereon, which improvements were incorporated with the basic de Bange invention in the guns used by the Government. These were the Davis patent of 1885 (Tr., p. 53) and the Gerdom patent of 1895 (Tr., p. 56).

It is stated in the findings (Tr., p. 61) that "some of the plastic pad obturators, used by defendant, have followed substantially the construction described in the foregoing Davis patent, but the greater number followed substantially the construction described in the foregoing Gerdom patent."

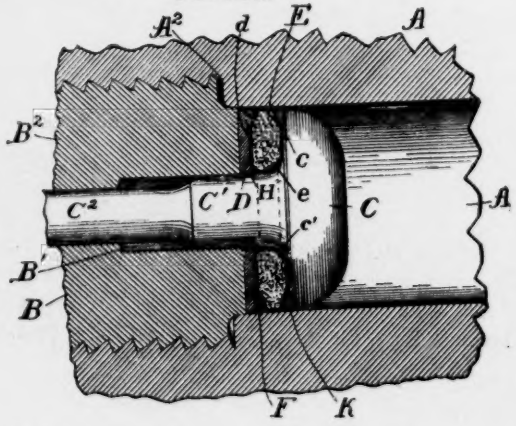
DE BANGE



DAVIS



GERDOM



Inasmuch as the Davis and Gerdom patents were granted *subsequently* to the de Bange patent, and for improvements upon the de Bange obturator, they have no special bearing upon the issues to be decided by this Court. They do, however, contribute material evidence as to the importance of the de Bange invention.

The Davis patent, No. 318,093, dated May 19, 1885 (Tr., p. 53), is on its face limited to a mere improvement upon de Bange. The specification says:

> "My invention is particularly intended as an improvement upon No. 301,220, of July 1, 1884" (the de Bange patent).

The Davis patent proposes a very slight modification in the shape of the steel rings, namely, imparting to them "angular concave faces." This is but a trifling change of form. This improvement was but little used.

The Gerdom patent, No. 539,733, May 21, 1895 (Tr., p. 56) shows that, *after ten years experience with the de Bange gas-check*, the only improvement that could be suggested was a very slight change of detail.

Gerdom's specification says:

> "My invention relates to improvement in gas checks for breech-loading guns, and it consists of certain improvements in the type of gas check known as the De Bange gas-check in which a plastic pad made mostly of asbestos is used" (p. 56).

The only modification proposed by Gerdom consisted in using split steel rings slightly larger in diameter (from 0.01 to 0.02 of an inch) than the diameter of the bore of the gun. This slight modification (enlarging the diameter of the rings) facilitated the withdrawal of the breech-block after firing.

On the opposite page we have given reproductions of one drawing from each of the three patents, de Bange, Davis and Gerdom. The substantial identity in form, as well as in substance, is evident at a glance. Every element of the de Bange Gas-Check, as specified in Claim 1 of his patent, is present in the Davis and Gerdom constructions, and appears in almost the identical form illustrated in the de Bange patent.

It would be difficult, if not impossible, to find another instance of an important invention surviving for the entire lifetime of the patent (and indeed for long thereafter) in almost the same form given thereto by the original inventor. This is, indeed, a very remarkable tribute to the completeness and thoroughness of the inventor's work. It is also a matter of importance in the estimation of the amount of compensation to be awarded for the use of the invention.

Other Gas-Checks.

The Findings of Fact contain references to several forms of gas-checks other than the de Bange. Thus, Finding II., page 21, contains the following:

> "The Elswick cup gas-check and the Broadwell ring gas-check had each been in successful use in connection with the slotted screw breech-plug for some years before de Bange's gas-check was made."

Also on pages 36–40, in an article translated from "Memorial de Artilleria," will be found a description of the Freire gas-check, which appears to have been in use in Spain upon *small guns* at that time (1883).

All the foregoing systems of obturation are of the steel-ring type, *i. e.*, a type which depends for its operation upon the flexure of a steel cup or ring. This type of gas-check has been disapproved by the Ordnance authorities of the United States. In Ordnance Notes for April, 1883 (Tr., p. 34), we find the following:

> "Broadwell's breech-mechanism, as copied by Krupp is too well known to need description here, but even in its most approved form it fails under the crucial tests imposed by conditions (2) and (3). Reports have over and over again been made on it, stating that the greatest care is necessary to preserve the essential parts *closing the escape of gas*—that is, *the Broadwell ring* and the plate on the breech-block against which it rests—from accidental injury. A blow or dent or burn may so de-

form these delicate parts as to cause an escape of gas, which once established rapidly develops, and if neglected would quickly render not only the breech-mechanism, but the gun itself unserviceable. Moreover, the slot cut for the breech-block must to a certain extent weaken the gun longitudinally."

In Finding VII, page 47, extracts are given from various official and authoritative works on ordnance. Ingersoll's text-book, in use at the U. S. Naval Academy (Ed. 1894), says:

> "The advantages of the De Bange Gas-check are certainty of action, durability, and ease of adjustment. It requires no great accuracy of workmanshp or care in fitting, and it may be changed in case of accident with little delay."

In Capt. Metcalf's text-book, in use at West Point Military Academy (Ed. 1894) is the following:

> "The Broadwell ring has to seal four surfaces not protected from dirt instead of but two, and the joint most difficult to seal is that which is most exposed to dirt.
>
> "Of the attached gas checks the Freyre, being inorganic, is less subject to extreme variations of temperature; it also takes up less room in the thickest part of the gun. It is open to the objection that a slight nick on the edge of the ring might render the entire apparatus worthless.
>
> "To the last consideration is due the almost universal employment of De Bange gas check, since this has been found almost indestructible by the accidents of service and to resume its shape when deformed in the firing."

It will be observed that the employment of the De Bange gas-check is said to be "almost universal."

In "Engineering," April 29, 1892, in an article entitled "Modern United States Artillery," it is stated that

> "*with the exception of Germany*" (which country could not be expected to adopt a French invention) "the

various nations have generally adopted the interrupted-screw system. Among the latter nations is the United States."

Then the two systems are compared, and in the course of the comparison it is said:

> "The principal advantage of the Krupp system is its simplicity. It is, on the other hand, obliged to employ *a much inferior gas check*." (The de Bange obturator is not applicable to the sliding-wedge breech-block employed in the Krupp gun.) "A few grains of sand or slight fouling is sufficient to allow a slight escape of gas, and the erosion once begun will soon destroy the gas check."

The flattering accounts of the Spanish gas-check (Freire), published in 1883, are from a Spanish source, based on experiments made with *small guns*. A serious objection to this gas-check is stated in Capt. Metcalf's book, quoted above; namely, that "a slight nick on the edge of the ring might render the entire apparatus worthless." Moreover, the fact that it is not used in any system of Modern Artillery is proof of its inferiority.

The facts thus presented show that the de Bange obturator is so far superior to all other systems as to be practically indispensable. In a matter that concerns national defense, the most efficient device is a virtual *necessity*.

SECOND.

The Jurisdiction of the Court of Claims.

The decision of the Court below concisely passes upon the question of jurisdiction in one paragraph, as follows:

> "A defense going to the jurisdiction of the court is raised. We think the case is settled by the case of United States v. Berdan Fire Arms Co. (156 U. S., 552).

> The findings disclose an invitation to present the details of the patent to the defendant, its examination by a board of officers appointed to investigate such inventions, and its final use without the slightest claim of ownership. Nothing appears to show an intention to dispute claimant's title to the patent, hence an implied contract arose to pay for such use."

The doctrine by which the question of claimant's right to recover compensation by a suit in the Court of Claims is set forth in the cases of *United States vs. Palmer*, 128 U. S., 262, 269, and *United States vs. Berdan Arms Co.*, 156 U. S., 552.

This doctrine was stated and *approved* in the subsequent cases of *Russell* (182 U. S., 516) and *Harley* (198 U. S., 229), upon which counsel for the Government rely. The facts of these last mentioned cases placed them outside the doctrine of the Palmer and Berdan cases, so that by paying proper attention to those decisions it is easy to obtain a clear definition of the doctrine.

It is evident from all these cases that one of the decisive facts is whether or not the use of the patented invention by the Government was an *infringement*, which is a "only a tort," and therefore "creates no cause of action cognizable in the Court of Claims" (156 U. S., p. 566). This Court, therefore, laid it down as a rule that:

> "Something more than a mere infringement, which is a tort and not within the jurisdiction of the Court of Claims, is necessary to enable the petitioner to maintain this action" *(Id.*, p. 566).

We shall see presently that the vital difference between the Russell case and the Berdan case was that the Russell invention, if used by the Government at all, was expressly and repeatedly declared by the claimant himself to have been an infringement; that is to say, a use without his consent, and hence a tortious use.

The controlling facts in the Berdan case are set forth in the following quotations from the decision of this Court therein:

> "It appears that Berdan invented the extractor-ejector; that he received a patent therefor and assigned

such patent to the petitioner. It also appears that the government had made use of this invention, or at least one differing from it only in the substitution of a spiral for a flat spring. These springs 'perform the same office and attain the same result in the same way,' and the use of the one for the other is a 'matter of choice, and in no way material to the result.' Upon these facts alone, thus briefly stated, the defendant, were it a private person, would be liable to an action of infringement. Nor would it be a defence to the action that such person had, subsequent to Berdan's invention, and without knowledge thereof, devised the contrivance which he was using. He would be in the attitude of a subsequent inventor, and the prior inventor is the one who, under the statutes, is entitled to the monopoly (Rev. Stat., Secs. 4884–4886). 'For any one invention but one valid patent can exist; and of several distinct inventors of the same invention one only is entitled to receive a grant of the exclusive right. This one is the original and first inventor' (1 Robinson on Patents, sec. 56). That the peculiar contrivance used by the government was devised by Adams, one of its employes, and that it differs from the Berdan invention in the use of a spiral instead of a flat spring, in no manner diminish the patent rights of Berdan or his assignee, the petitioner, or change the fact that the use made by the government of the extractor-ejector was an infringement upon such rights.

"But as heretofore stated, something more than a mere infringement, which is a tort, and not within the jurisdiction of the Court of Claims, is necessary to enable the petition to maintain this action. Some contractual liability must be shown."

We now come to this Court's statement of the facts found in the Berdan case, and which showed "a contractual liability." Those facts are strikingly paralleled in the case at bar, which also presents *other* facts, going far beyond those of the Berdan case in the direction of showing a contractual liability. We ask particular attention to the following quotations from the decision of this Court in the Berdan case, for the

reason that the Brief of the other side *totally ignores* this precise and unmistakably plain statement of the decisive facts. It was "**Upon these facts**" that the Palmer and Berdan cases were decided :

> "In U. S. v. Palmer, 128 U. S., 262, 269, 9 Sup. Ct., 104, it appeared that the petitioner was the inventor of certain improvements in infantry equipments ; that he presented such improvements to a board of officers appointed by order of the Secretary of War to meet, consider, and report upon the subject of a proper equipment for infantry soldiers ; that such board recommended the use of his improvements ; and that the improvements were adopted by the Secretary of War as part of the equipments of the infantry soldiers of the U. S. Army. **Upon these facts** the Court found that there was an implied contract, Mr. Justice BRADLEY, speaking for the Court, saying : 'No tort was committed or claimed to have been committed. The Government used the claimant's improvements with his consent; and, certainly, with the expectation on his part of receiving a reasonable compensation for the license. This is not a claim for an infringement, but a claim of compensation for an authorized use, two things totally distinct in the law, as distinct as trespass on lands is from use and occupation under a lease. * * * We think that an implied contract for compensation fairly arose under the license to use, and the actual use, little or much, that ensued thereon. The objection, therefore, that this is an action for a tort falls to the ground."
>
> * * * * * * *
>
> "While the findings are not so specific and emphatic as to the assent of the Government to the terms of any contract, yet we think they are sufficient. There was certainly no denial of the patentee's rights to the invention; no assertion on the part of the government that the patent was wrongfully issued; no claim of a right to use the invention, regardless of the patent; no disregard of all claims of the patentee, and no use, in spite of protest or remonstrance. Negatively, at least,

> the findings are clear. The government used the invention with the consent and express permission of the owner and it did not, while so using it, repudiate the title of such owner."

Comment seems to be almost superfluous. We are here dealing with precisely the same proposition that was urged as a defense in the Berdan case, namely, that the Government's use of the patented invention was a tort. *Every fact* recited in the foregoing quotation is found in the present case, with additional facts giving a complete refutation to the idea that the use by the United States of "the deBange Obturator" was a tortious use, in defiance or denial of his rights as inventor. This Court cannot do otherwise than repeat the words: "The objection, therefore, that this is an action for tort falls to the ground."

Moreover, we submit that, in the present case, the assent of the Government to the payment of just compensation *was* clearly evidenced by the reference of the claim to the Court of Claims.

In view, however, of what appears to us to be an exceedingly inaccurate and misleading presentation by counsel for the Government herein of the facts of the Berdan case, we feel called upon, at the risk of being tedious, to present to this Court in parallel columns, the facts of the Berdan case, as stated in the decision of this Court, and the corresponding facts of the present case, as found by the Court below.

BERDAN.	DE BANGE.
1. Berdan's invention and patent were assigned by him to the corporation of which he was an officer, and which he represented in presenting the claim to the Government.	1. De Bange assigned his invention and patent to the claimant, and was an officer of it, and represented it in his interviews with the representatives of the United States, and in the correspondence which he had with our Ambassador and the Secretary of the Navy.
2. Berdan offered his invention to the Government in competition with others.	2. The United States, through its diplomatic representative Commander Chad-

wick, and also through the Gun Foundry Board, sought and obtained from the inventor in person and from the claimant company the information needed for the construction of the de Bange obturator, and also procured a sample of the obturator; all of which information and material were freely furnished by de Bange and the claimant.

3. The Government officers knew of the Berdan patent before adopting the invention.

3. The Government officers knew of the de Bange patent before adopting the invention. The patent issued in June, 1884, and the first use of the de Bange obturator was in 1885. (Finding VI p. 43). This was the form of de Bange gas-check described in the Davis patent of May 19, 1885, taken out by an employé of the Navy Department, which patent expressly says: "My invention is particularly intended as an improvement on Patent No. 301,220, of July 1, 1884" (the de Bange patent). Furthermore, the greater part of the use by the Government occurred after claimant had applied to Minister Reid and Secretary Tracy in 1891 for compensation, and after the claim had been referred to the Court of Claims for determination. The Gerdom patent, which describes the precise form of the de Bange gas-check finally settled upon and most largely used by the Government, was not granted until 1895, long after de Bange's claim had been formally presented, and indeed after the petition in the Court below had been actually filed upon the suggestion of the Secretaries of War and Navy.

4. The Government officers expected that the Government would pay for Berdan's invention if it should be accepted.

4. It must be inferred from the fact that the Government officials applied to the claimant for a full description and sample of the de Bange invention that they intended to pay whatever might be justly due therefor. The reference of the claim to the Court of Claims is a clear manifestation of the intent to pay just compensation for the use of the device.

5. The excuse of the Government officers, in not paying for the Berdan invention was, that the Government was not using his patented invention, but was using the patented invention of Adams, which was alleged to be different from Berdan's.

5. The only reason offered by the officers of the Government for not paying for the de Bange invention was a question in their minds whether the Government, in using the device described in the Davis and Gerdom patents, was using de Bange's patented invention. There was no *denial* of use, as in the Berdan case, but only a *legal question* which the Departments of War and Navy did not feel competent to decide.

6. In the Berdan case the Court of Claims held that the difference between Berdan's construction and that of Adams, which was adopted by the Government, was immaterial, and that the Berdan patent covered the same.

6. The Court of Claims held in the present case, that the Davis and Gerdom inventions were mere improvements in detail on de Bange's, and were, therefore, covered by the de Bange patent; and this is stated in the Davis and Gerdom patents themselves.

7. The Government officers refused to accept Berdan's competitive offer of his invention, and adopted another competitive device invented by Adams.

7. The Government took de Bange's invention as furnished to its officers by de Bange and the claimant, and always called the device they used the "de Bange gas-check."

8. In the Berdan case the Court found that the case was "not a claim for infringement, but a claim of compensation for an authorized use; two things totally distinct in law."

8. In this case the Court below has found, and the undisputed facts clearly show, that this is not a claim for infringement, but a claim of compensation for an authorized use.

The Court will observe, as we have already said, that the facts establishing an implied contract herein are much stronger than those of the Berdan case, notably in the following particulars:

1. In this case the invention was obtained by the Government directly from the patentee.

2. It was sought for by the authorized agents of the Government, and freely communicated by the inventor.

3. The inventor gave to the accredited representative of our Government minute shop-directions for fabricating the device, which shows a clear understanding that the *actual manufacture by the defendant* was in contemplation *by both parties.* Beyond any question whatever the use was with consent by the inventor, as distinguished from a tortious use.

4. The invention was adopted by the Government *under the name of the inventor*, and has been used during the entire lifetime of the patent under his name.

5. The claimant's request for compensation, when formally presented to the heads of the proper Executive Departments of the Government was by them, and upon recommendation of Admiral Sampson, then Chief of Ordnance of the Navy, expressly referred to the Court of Claims for adjudication.

If the foregoing facts do not constitute an implied contract, it would be difficult to conceive how a case of implied contract could ever be made out.

Correspondence Between Col. De Bange and the American Minister and Secretary of the Navy.

In Finding VI., beginning at bottom of page 43, are copies of part of a correspondence between Col. de Bange and the American Minister at Paris, Mr. Whitelaw Reid, and Secretary of the Navy, Mr. Tracy. We do not know why or at whose instance these letters were introduced into the Findings, or why a part only of the correspondence is included.

Since, however, the letters are before the Court, we submit a few comments thereon. Certainly they contain nothing prejudicial to claimant's case, but quite the contrary. Col. de Bange's letters are clearly those of a man who has permitted his invention to be used by the Government of a friendly Power, expecting proper compensation therefor.

The first letter given to us is one by Col. de Bange to Mr. Reid, under date of June 29, 1891. In its opening paragraph, Col. de Bange speaks of a letter he had received from Mr. Reid and of his own "previous observations." The nature of those "previous observations" does not appear. He then points out the superiority of his obturator over the metallic ring, saying:

> "Thus all the makers of cannon are led to employ my invention, either openly or in a disguised form, styled by them improvements." He adds:
>
> "The War and Navy Departments at New York, which are well acquainted with the question, will certainly not contest the truth of my assertions."

Col. de Bange further said, in the same letter:

> "The English Government particularly had taken up my system, and without my having demanded anything had offered me twenty thousand pounds sterling to indemnify me. I refused this offer, it is true, but because as a French officer *I ought not to aid in arming a power which I do not consider as friendly.* In fact, deprived of my assistance, England has copied me badly and possesses but a moderate artillery." (Italics ours).

Manifestly, Col. de Bange here made an important (and for our purposes a material) distinction between his dealings with the United States, and with England, which was not at that time on friendly terms with France. To this country he not only gave his *consent* to the use of his invention, but gave also his "*assistance*," to the end that the United States might have the benefit of all his skill and technical knowledge in the actual making of the device. This is emphasized by what is said in his letter of August 8, 1891 (Tr., p. 45), to the Secretary of the Navy, Mr. Tracy:

> "Furthermore, I have seen at Paris many of your officers *to whom I furnished without reserve all the information which they have asked of me.*" (Italics ours).

This letter clearly shows that Col. de Bange's attitude was that of a *claimant*, believing himself justly entitled to compensation for his property, which had been taken with his consent, and confiding in the justice and fairness of the Government with which he had been dealing. He concludes his letter by saying:

> "If you will have the kindness to notify the Government of my claim, I am confident it will see that justice is accorded me in the indemnity to which I believe myself to be entitled."

It thus conclusively appears that there was, on the part of Colonel de Bange, and those claiming under him and represented by him, a desire and willingness that the Government of the United States should adopt and use the invention, and an active and effective co-operation in order to place the Government in a position to manufacture the device to the very best advantage. These undisputed facts utterly preclude the idea that the use of the device by the Government was a tort.

On the other hand, the attitude of the Government as defined by the acts of its responsible officers appears with sufficient clearness to bring the case well within the doctrine of the Palmer and Berdan cases.

In the first place, the request made to Col. de Bange for the specific directions which a manufacturer would find useful in making the obturator, and the use which the Government made of those directions in the construction of guns embodying the de Bange obturator, is susceptible of but one interpretation, namely, that the Government expected honorably to meet all just liability arising from the use of the invention.

The Court surely will not entertain the idea that the responsible agents of the Government, in securing from the inventor not only the basic principles of his invention, but also the benefit of his manufacturing experience, harbored the dishonorable purpose of using that information in a wrongful appropriation of said invention.

Again, the visit of the entire Gun Foundry Board, in its official capacity, to the claimant's works in August, 1883, and its inspection by claimant's permission of the de Bange system of ordnance, proves a coming together of the minds of the

parties with reference to the adoption and use of the de Bange obturator, which was inspected at that visit, and was subsequently featured in the report of the Board to Congress in 1884.

Counsel for appellant assert repeatedly in their brief that there were no dealings between the Officers of this Government and the claimant corporation (as distinguished from Col. de Bange personally), until 1894. Counsel ignore this visit of the Gun Foundry Board to claimant's works in August, 1883.

The correspondence of 1891 (Tr., pp. 45–47) contains no denial of the patentee's right, and sets up no claim of adverse right. On the contrary, the letter of the Secretary of the Navy contains the statement that

> "The gas-check which has been adopted for the naval guns of 6-inch calibre and upwards resembles in certain features that described in U. S. patent 301,220, issued to Colonel de Bange" (Tr., p. 47).

Counsel for the Government in their Brief cite Secretary Herbert's letter of February 10. 1894, and say that it refers to "a previous denial and rejection of the petitioner's claim, and and as reaffirming this action" (Brief, p. 31). Statements of like import occur elsewhere in the Brief. There is, however, no foundation for such statements. Claimant's right as patentee of this invention was never *denied*, and its claim was never *rejected*. On the contrary, the final "decision" of the Department was that the questions involved ought to be determined by a competent legal tribunal, and to that end it was suggested that claimant file a petition in the Court of Claims.

The Russell Case (182 U. S., 516).

The Russell case, so far from modifying in any particular the doctrine of the Palmer and Berdan cases (which meanwhile had been cited and approved in the *Schillinger* case, 155 U. S., 320). The following is from the decision of this Court in the Russell case:

> "The first sentence in the original opinion of the Court below (meaning that in the Palmer case) strikes

> the keynote of the argument on this point. It is as follows: 'The claimant in this case invited the Government to adopt his patented infantry equipments, and the Government did so. It is conceded on both sides that there was no infringement of the claimant's patent and that whatever the Government did was done with the consent of the patentee and under his implied license.' We think that an implied contract arose under the license to use, and the actual use, little or much that arose thereon" (182 U. S., p. 531).

But this Court found that the **facts** of the Russell case differed widely from the line of cases beginning with and following the Palmer and Berdan cases, saying:

> "But there is a wide difference between the **facts** in those cases and the facts in the case at bar" (*Id.*, p. 531).

And it clearly appears from the decision that the "wide difference" in the facts lay in this, namely, that in the Russell case, the use (if any there were) of Russell's patented invention was a tortious use, without his consent and against his protest. Russell's complaint was that the makers of the Krag-Jorgensen rifle, which the government adopted, *after having refused to adopt Ruesell's invention*, was an **infringement** of certain claims of his (Russell's) patent.

The facts then, are *exactly the reverse* of the controlling facts of the present case, and it ought not to be necessary for us to occupy the time of the Court in pointing this out. We are obliged, however, to do so because of the singularly inaccurate version of the Russell case (to state the matter mildly) presented in the Brief for the United States (pp. 35-43).

Russell's own statement of his case was a claim that *infringement* had been been committed by the makers of the rifle.

In urging his claim before the War Department he repeatedly declared that this grievance was an *infringement*, saying (182 U. S., p. 519):

> "In the interest of Major Wm. R. Livermore, U. S. Army and myself, I have the honor to invite attention

to claims 22, 28 and 29 in U. S. patent No. 230,823, owned by us as we believe their provisions to be *infringed* in the construction of the Krag-Jorgensen magazine gun lately adopted by the War Department."

Again he said (p. 521) :

"I desire to say that I could practically could have no remedy for *infringement of my patent* against the Krag-Jorgensen Company."

Again (p. 522) :

"I presented to the Ordnance Office the claim that the gun recommended for adoption by the United States Army, known as the Krag-Jorgensen gun, *infringed* claims 22, 28 and 29 of my patent No. 280,823."

Russell appealed to the Commissioner of Patents in the matter, who replied to him that (p. 523) :

"it is not seen how the Patent Office has any jurisdiction in the matter concerning which you write. Questions of *infringement* can be determined only by the Courts."

Again Russell said (p. 523) :

"The patent *infringed* is one of long standing and no claim is made that the Krag-Jorgensen patents *infringe*, but it is claimed that the construction of the gun embodying those patents *does infringe my patent of 1880*."

And again, in a formal statement of his claim which he filed at the request of the Ordnance Department, he defined his claim in these words (p. 528) :

"I, therefore, base my claim for compensation on *the infringement of my claims* 22 and 28, and the *probable infringement* of claim 29, in my said patent No. 280,823,

of August 3rd, 1880, by the Krag-Jorgensen construction."

The Court on such a claim, so set forth, certainly could not find an implied contract of which the Court might assume jurisdiction. The controlling fact in the Russell case was thus distinctly stated by this Court (p. 535):

> "If the petitioners have suffered injury it has been *through the infringement of their patent*, not by a breach of contract, and for the redress of an infringement the Court of Claims has no jurisdiction."
>
> (Italics in above quotations ours.)

Certainly there was, indeed, a "wide difference" between the facts of the Russell case and those of the Palmer and Berdan cases, and a still *wider difference* between them and the facts of this case, in which the Government adopted the de Bange gas-check and used it *under the very name of the inventor*, after having procured from him, and from the claimant company (of which he was an officer), the most precise and detailed information as to the method of constructing and using it.

The Harley Case (198 U. S., 229).

This is also a case whereof the controlling *facts* placed the claimant outside the doctrine of the Palmer and Berdan cases. Those controlling facts were as follows:

The invention was made by *an employee of the Government*, and it appeared affirmatively that the officials who directed the adoption and use of the device did so in the belief that the Government had a right to use it *without compensation*. This fact obviously took the case outside the doctrine of the Palmer and Berdan cases. The evidence showed affirmatively that there was no intention on the part of the Government officials to pay anything for the use of the device.

Furthermore, the evidence showed that, although the patentee was at hand, and knew of the use of his invention, he acquiesced therein, without making any demand for payment for a period of *over fourteen years*.

The following extract from the decision of this Court in the Harley case will show how very different that case was from the present case. In dealing with the excuse offered in explanation of claimant's delay the Court (speaking by Mr. Justice McKenna) said:

> "We cannot assent to the suggestion that he 'was by coercion prevented' from making a demand 'in terms' by his subordinate position. How long must we suppose such coercion lasted and that he could have permitted a misunderstanding of his purpose? Six years passed and the Chief of Bureau with whom the negotiations were made went out of office; another succeeded. No demand was made of either for compensation. Further time passed and other Chiefs of Bureau succeeded. There was a succession of Secretaries of the Treasury; no demand was made of any of them. His first demand was the petition in this case, over fourteen years from his first interview with the Secretary of the Treasury. This delay cannot be overlooked or interpreted favorably to appellant's contention. He sues for $102,600, and this does not include the royalties that he contends he was entitled to for the first six years the device was used. He claims a royalty of twenty-five cents a day on an average of two hundred machines—that is $50 a day. He was an employee of the Government at a modest salary, and we cannot conceive there was no inducement in $50 a day to an explicit demand of his rights, or that he was willing to wait, for their realization for fourteen years, and even to lose compensation for six years by the operation of the statute of limitations. The rights of the Government are obvious. The contention of the appellant forces on it a liability that it might not have taken. It was given no election of the terms upon which it would use the register, or whether it would use it at all. Of course, this argument is based on the fact that there was no coming together of the minds of the parties, or as expressed by the findings of the Court of Claims, that 'it was supposed and understood' by the officers of the Government that appellant 'would neither expect nor demand remuneration.'"

We cannot think that the learned counsel for the Government have made a praiseworthy use of their ingenuity in attempting to force a seeming resemblance between the facts of the foregoing (Russell and Harley) cases, and those of the case at bar. We are bold to say that in respect of *every fact* which enters into the question of the existence of an implied contract the Russell and Harley cases are in direct contrast with the case at bar.

Other Contentions of Counsel for the Government in Regard to Jurisdiction.

The argument of counsel for the appellant on the subject of the jurisdiction of the Court of Claims rests largely upon two unsupported propositions of *fact*, namely:—

1. Counsel asserts that there is a distinction to be drawn between Col. de Bange, who is a person, and the claimant, which is a corporation, and contends that the dealings between Col. de Bange and the Government should be disregarded in determining the obligations of the Government to the patentee, the claimant corporation (Brief, pp. 13–15). For example, counsel say:

> "Whatever use there may have been was without recognition of title in the patentee to the thing used, because the owner of the patent, the appellee, had never presented itself or asserted its rights in the patented device until the letter of its counsel, dated July 31, 1894" (p. 14).
>
> "Resting the case solely upon what took place between the appellee and the United States, there is nothing in the record to show a meeting of the minds or agreement as to compensation, etc." (p. 15).

2. Counsel assert that the gas-check described by Colonel de Bange in his communication to Commander Chadwick (which counsel calls his "unpatented gas-check") is "materially different in important respects" from the gas-check described in the de Bange patent; and that this lack of iden-

tity between the two devices is " the very essence of the whole proposition " (pp. 20–26).

1.

We are confident that the attempt to draw a distinction between Colonel de Bange and his assignee, the complainant company, will not commend itself to the Court. The Court below, with all the evidence before it, regarded Col. de Bange's actions in the premises as having been done in a representative capacity. He was the inventor and the assignor to claimant, which being a corporation, could only act through an agent or representative. His application for patent was certainly made in the interest of claimant, because the invention was assigned before the application (Finding I., p. 14). Surely, in the absence of proof to the contrary, it would be presumed from this alone that all Col. de Bange's dealings with the United State's officials were in a representative capacity, and in the interest of those claiming under him as patentee.

This question, however, is a question of *fact*, and therefore the action of the lower Court in regard thereto is not subject to review. It could not be reviewed in the light of the testimony, because the testimony is not before this Court.

However, it sufficiently appears from the Transcript that Col. de Bange was the Managing Director of the claimant (Petition, p. 1, Sec. V.; p. 2, Sec. VI.; Finding VII., p. 48).

Furthermore, in speaking of " what took place between the appellee and the United States," counsel disregard the visit of the Gun Foundry Board to claimant's works in August, 1883, after the filing of the de Bange application and its assignment to claimant. Surely the Report of that Board to Congress on the de Bange obturator, followed shortly thereafter by the adoption and use of that mechanism, is sufficient in itself to lay the foundation for the jurisdiction of the Court of Claims.

2.

The imaginary distinction between the " patented de Bange Gas-check " and the " unpatented de Bange Gas-check " is one

that we shall have occasion to discuss under the next heading ("THIRD") of our brief. Therefore it will suffice here to point out that the argument of counsel for the United States rests solely upon *counsel's own assertions as to matters of fact.* Those assertions of counsel are not only without support in the Findings of the lower Court, but are directly contrary thereto. The Court below has found that the Gas-check used by the Government is substantially identical with that described and claimed in claimant's patent.

The Court below has specifically found that the devices of the Davis and Gerdom patents are the same in all essential respects as the invention described and claimed in the de Bange patent (Tr., last par. of p. 65, and first of p. 66). Speaking of the Gerdom patent the Court point out that, in details of construction, it is "strikingly similar" to the description furnished by Col. de Bange to Commander Chadwick, "save in the substitution of steel for brass." And the Court continues:

> "De Bange treated the detail of construction as non-essential. The record discloses that in all the subsequent inventions the pad of asbestos and tallow is the functioning element of the device, without which its utility is as nothing. The necessary expansion, indispensable to forward the operation of both the Davis and Gerdom patents, is supplied by the De Bange pad of asbestos and tallow. The defendant used the Gerdom improvement and paid the patentee (Gerdom) substantial royalty therefor. That it was an improvement of value is not disputed; but it was only an improvement, and did not supplant the De Bange patent as specified and claimed in letters 301, 220."

In the present case there is not even a color of support for the claim that the Gerdom and Davis patents cover gas-checks substantially different from that of the de Bange patent, for the later patentees themselves states in so many words that their inventions are mere improvements upon de Bange's patented invention.

THIRD.

Reply to Appellant's Criticisms of Claim 1.

Pages 46 to 83 of Brief for Appellant are occupied with criticisms of Claim 1 of the de Bange patent. The first proposition is, in substance, that claim 1 should be, by interpretation, narrowly restricted to a gas-check in which the yielding pad is encased in an envelope of *copper* sheets and enclosed between rings of *brass*. The contention is that a gas-check in which the pad is covered by *cloth* (instead of copper sheets) and is enclosed between *steel* rings (instead of *brass*) is not within the scope of the claim. Manifestly, this is but another way of saying that the materials used for the cover of the pad and for the rigid metal rings are matters of *substance*, constituting essential features of the invention, and not matters of *form*, as found by the Court below upon the evidence submitted to it. It is true that the proper interpretation of a patent is a question of *law* to be determined by the Court. But the question here raised *depends upon* a question of *fact*, namely, whether or not the materials whereof the cover and fittings of the yielding pad are made are essential features, or are non-essential features, of the obturator. Appellant's proposition can be sustained only upon the finding that said details are essential features of de Bange's invention. But that supposition is without support in the record. In fact the Court below has found directly the contrary.

We believe the foregoing consideration disposes of this contention; but there is more that may be said.

The claim itself lends no aid to the interpretation for which appellant contends, for it does not recite among its elements the materials whereof the envelope and rings are made. It is an unheard of proposition that a Court should read into a claim matters not made essential by the terms of the claim itself, for the purpose of rendering the claim valueless.

We quote the claim again:

> "1. The partially-threaded plug B, headed pin N N^1, extending through said plug, and the yielding packing

> M, arranged between the head N^1 and the inner end of the plug, in combination with each other and with the gun A, arranged as shown, to allow the pin to be driven rearward and compress the packing, as herein specified."

The proposition of appellant's counsel is that the words " yielding packing M " should be held to limit the scope of the claim to the use of an envelope of *copper* and to rings of *brass*. That, we say, is an unheard of proposition. The decisions cited give it no countenance whatever. It is true that the letter M is used in the patent to designate the packing as a whole ; and we fully agree that a complete packing includes a suitable flexible covering for the pad, such as metal foil, cloth or the like, and rigid metal rings between which the pad is enclosed. It does not follow, however, that the envelope must be of *copper-foil*, or that the rigid metal rings must be of *brass*. It is, on the contrary, obvious that any suitable material may be used for these subsidiary parts ; and unless the claim were *in terms* limited to specific materials in contradistinction to other materials, and the patentee had made it clear that he intended to limit himself to those specific materials, the claim may not be restricted by arbitrarily reading such materials into it.

Moreover, the specification says as follows :

> " The head N′ is adapted to receive the force of the powder at the discharge. At the moment of the discharge this head moves backward, compressing *a relatively soft and expansible packing ring M behind it.* Certain portions of *this ring* will be distinguished *when necessary* by additional marks as M^1 M^2."

In the case of claim 1, the patentee deemed it not " necessary to specify the parts M^1 M^2 of this ring (the " body " of the ring being M^1 and the copper-foil envelope M^2). Therefore, the patentee intelligently phrased that claim for the purpose of covering " the yielding packing M " regardless of the specific materials employed in its make up. It is a claim intentionally and intelligently formulated in terms commensurate with the scope of the invention.

Furthermore, it would do violence to the terms of the

claim to make the words "*yielding* packing M" embrace as essential parts "the *rigid* shells" of brass M^3 M^3 (claimed in claim 3). The pliable copper envelope M^2 may be properly regarded as a part of the "yielding packing" and the patentee so states; but he does not say that the "strong shells of brass M^3 M^3" are parts thereof. Nevertheless, it is the contention of the other side that the specific metal whereof those shells were made ought be arbitrarily read into the claim for no other purpose than to render it worthless.

Finally, the specification says expressly that

> "Modifications may be made in the forms and proportions."

It is not, however, necessary for a patentee to state that. This Court has decided as follows:

> "Patentees sometimes add to their claims an express declaration to the effect that the claim extends to the thing patented however its form or proportions may be varied. But this is unnecessary. The law so interprets the claim without the addition of these words" (*Winans vs. Denmead*, 15 How., 330, 342).

The mere substitution of one material for another, without changing the function of the device, does not amount to invention, or change essentially the character of the device as a whole, even where the device is improved by the substitution. This has been decided by this Court in a long line of cases beginning with *Hotchkiss vs. Greenwood*, 11 How., 248. In deciding that case, which involved the substitution of porcelain for metal in the construction of a door-knob, this Court (speaking by Mr. Justice NELSON), said (p. 265).

> "No one will pretend that a machine, made in whole or in part, of material better adapted to the purpose for which it is used than the materials of which the old one is constructed, and for that reason better and cheaper, can be distinguished from the old one."

The Court below disposed of this proposition (which was the main defense in that Court) by reference to the settled rule

given for interpretation of the specification and claims of a patent for a meritorious invention, as laid down in "a multiplicity of cases too numerous for citation." The cases quoted by the Court are ample to sustain their decision; but we will cite a few additional cases.

From the time of *Winans vs. Denmead* (15 How., 330) down to the present day, "it has been the settled doctrine of this Court" (Western Elec. Co. vs. La Rue, *infra*) "that a patent is not to be limited to one particular form of machine, excluding all other forms" if the claim "can fairly be construed otherwise."

This Court, in deciding that leading case, said:

> "Now, while it is undoubtedly true that the patentee may so restrict his claim as to cover less than what he intended, or may limit it to *one particular form of machine*, excluding *all other forms*, though they also embody his invention, yet such an interpretation should not be put upon his claim if it can fairly be construed otherwise; and this for two reasons:
>
> "1. Because the reasonable presumption is, that having a just right to cover and protect his whole invention, he intended to do so. Haworth v. Hardcastle, 1 Web., P. C. 484.
>
> "2. Because specifications are to be construed liberally, in accordance with the design of the Constitution and Patent laws of the United States, to promote the progress of the useful arts, and allow inventors to retain to their own use, not anything which is matter of common right, but what they themselves have created."
>
> Citing numerous authorities.

In *Western Electric Co. vs. La Rue* (139 U. S., 601, 608), this Court said:

> "Since the case of Winans v. Denmead (15 How., 330) it has been the settled doctrine of this Court as expressed in the opinion of Mr. Justice CURTIS, page 343, that the patentee, having described his invention and shown its principles, and claimed it in that form which most perfectly embodies it, is, in the contempla-

tion of law, deemed to claim every form in which his invention may be copied, unless he manifests an intention to disclaim some of these forms."

In the Richardson Valve Case, already cited (113 U. S., 157), this Court, speaking by Mr. Justice BLATCHFORD, said:

> "Richardson's invention brought to success what prior inventors had essayed and partly accomplished. He used some things which had been used before, but he added just that which was necessary to make the whole a practically valuable and economical apparatus. The fact that the known valves were not used, and the speedy and extensive adoption of Richardson's valve, are facts in harmony with the evidence that his valve contains just what the prior valves lack, and go to support the conclusion at which we have arrived on the question of novelty. When the ideas necessary to success are made known, and a structure embodying those ideas is given to the world, it is easy for the skillful mechanic to vary the form by mechanism which is equivalent, and is, therefore, in a case of this kind, an infringement."

In *Turrill vs. Railroad Co.*, 1 Wall., 491, this Court thus stated the general rule:

> "Patents for inventions are not to be treated as mere monopolies and, therefore, odious in the eyes of the law; but they are to receive a liberal construction, and, under the fair application of the rule, *ut res magis valeat quam pereat*, are, if practicable, to be so interpreted as to uphold and not destroy the right of the inventor."

In *Klein vs. Russell*, 19 Wall., 433, 466, the Court said:

> "The Court should proceed in a liberal spirit so as to sustain the patent and the construction claimed by the patentee himself, if this can be done consistently with the language which he has employed."

An excellent statement of the rule is given by Judge COXE, of the Third Circuit, in deciding *Consolidated Fastener Co. vs. Columbia Co.* (79 Fed. Rep., 795), as follows:

> "Where the Court is convinced that the patentee has made a valuable invention, it should extend scant sympathy to interpretations, however plausible, which deprive him of the fruits of his ingenuity. It is not material that he has employed equivocal words and indeterminate expressions if the invention be described with reasonable certainty. If the claims are susceptible of two interpretations, that one should be chosen which upholds and vitalizes the patent. Ingels v. Mast, 6 Fish. Pat. Cas. No. 7033; Machinery Co. v. Sharp, 54 Fed., 712."

This decision was affirmed by the Circuit Court of Appeals. The Court (WALLACE, LACOMBE and SHIPMAN, JJ.) after stating that it was from the whole patent "quite plain what the improvement was which he (the patentee) had in mind," said:

> "We know of no principle of patent construction which, in such a case (the improvement being novel) would require the Court to read into the claim the particular concrete form of improvement shown in the drawings and in the descriptions of such drawings."

Those learned and able Judges, very experienced in deciding cases arising under the patent laws, knew of "no principle of patent construction" which would warrant what counsel for appellant ask in the present case.

In the *Lawn Sprinkler case* (82 Fed., 428) the invention was of very little importance, nevertheless the Court (C. C. A.) held that the rule stated in the foregoing cases was applicable. The Court (speaking by Judge TAFT) said:

> "'Now, it is quite true that this was not a very important discovery. The art in which it was devised is not the most useful. It could not properly be described as either a pioneer or primary invention, but it does indicate a distinct step forward in the art. It certainly

is not in that class of patented devices which are on the border line of mechanical skill and invention, and for which courts have devised the strictest canons of construction. It shows an ingenuity which courts are glad to reward, and which they will not allow technical rules of interpretation, intended to narrow the scope of patents of doubtful merit, to impair or destroy.'

" ' In Blandy vs. Griffith, 3 Fish, Pat. Cas. 609, Fed. No. 1529, the Court stated the rule of infringement as follows:

> " ' As long as the root of the original conception remains in its original completeness, the outgrowth, whatever shape it may take, belongs to him with whom the conception originated. The root of the conception must always be described in the specification and crystalized in the claim. It is the duty of the Court in giving interpretation to the patent, to give it that interpretation (if the patent is capable of it) which will secure to the inventor that which he has in fact invented.' "

In concluding our discussion of the proposition that the claim ought to be narrowed to *immaterial* and *unexpressed* details, we would remind the Court of the familiar doctrine of "equivalents", according to which the claim, even if it had been limited in terms to a *copper* envelope and *brass* shells, would be entitled to such a construction as to cover *equivalent substances*, such as a canvass cover and steel shells. (See *Machine Co. vs. Murphy*, 97 U. S., 120, 125.)

This Court, in deciding that case, said (p. 125):

> "Authorities concur that the substantial equivalent of a thing, in the sense of the patent law, is the same as the thing itself; so that, if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form, or shape."

2.

Another contention of counsel for the Government is that Claim 1, if not construed *so narrowly* as to render it worth-

less, should be construed *so broadly* as to render it invalid by the prior state of the art. In fact, counsel say: "The only other possible interpretation that can be placed upon Claim 1 is a very broad interpretation," * * * "broad enough to include not only the specific yielding packing described in the specification, * * * but also any other yielding packing of whatsoever description" (Brief, p. 57).

If the Court accepts the foregoing as a correct statement of the rule of interpretation of a patent claim, it must do so upon the authority of the learned counsel who sign the brief, for they cite no other authority, and it is quite safe to say that none other exists. That there exists another "possible interpretation" of the claim beside the "very narrow" and "very broad" interpretations favored by appellant's counsel, is evident from the fact that another interpretation was adopted by the Court below, namely, that which covered the invention which the patentee admittedly made.

The true rule of interpretation, followed by the Court below and sustained by every pertinent decision of this Court is to ascertain "what the invention was" and then to construe the "claim so as to be co-extensive with the invention, if that can be done without doing violence to the language." That certainly can be done in the present case, and manifestly the Court below did not err in so doing.

But we could well afford to accept the dictum of counsel for the defendant, and to agree that the claim be so construed as to cover "any other yielding packing of whatsoever description," provided only that it be one which will perform the function of "the yielding packing" of the de Bange patent, namely, to expand with sufficient promptness and force to cut off the escape of the powder gases to the rear. The Findings herein clearly show that de Bange was entitled to a claim broad enough to cover any and every obturator having as its sealing element a plastic composition. But the *specific* claim is, in this case, just as good as a *generic* claim would be, for the reason that the asbestos and tallow composition is the only existing *species* of the *genus* plastic pad obturators. Counsel do not cite to the Court any pre-existing yielding pad capable of performing this function. In fact none existed prior to de Bange, and *none has been discovered up to the present day,*

other than the composition of asbestos and tallow invented by de Bange. The Court below found from the evidence that—

> " the de Bange invention was in fact and in substance, a discovery of a distinct, new and novel system of obturation. No system of obturation prior to it had anticipated the use of a yielding packing ring of asbestos and tallow; repeated attempts at a substitute has failed, and the findings disclose its successful use and operation ever since."

Counsel for appellant will not pretend that they can point to any yielding packing, known either prior to de Bange's patent or subsequent thereto, that is susceptible of use for the obturation of a breech-loading gun. The only prior patent which counsel mention in their brief is the Mauduit French patent of 1870. There is nothing to show what that patent describes; but if it were before the Court it would be seen that it describes a *rubber* obturator, which is inoperative and useless, as the findings show, and as proved by defendant's own witnesses in the Court below (Tr., pp. 24–26, 28).

Pages 63 to 83 of Brief for the United States are occupied with a discussion of decisions, which, so far as they are pertinent at all, do not sustain but on the contrary clearly refute, the contention of counsel for appellant. The point of most of these decisions is that (as in *McClain vs. Ortmayer*, 141 U, S., 419):

> " the Courts have no right to enlarge a patent beyond the scope of its claims as allowed by the Patent Office " (cited on pp. 64, 65).

The Court will observe that this is precisely what counsel for appellant are, in this part of their Brief, asking the Court to do.

Furthermore, this Court held in *McClain vs. Ortmayer*, that:

> " Where a claim is fairly susceptible of two constructions, that one will be adopted which will preserve to the patentee his actual invention."

We could ask nothing better than this to support our view of the point under discussion.

In *Santa Clara Mill Co. vs. Prescott* (cited on p. 66), the C. C. A. held that the patentee

> " cannot demand that there be imported into it [the claim] an element which is not there distinctly stated or necessarily implied ?

We have not demanded this, nor has the Court below done it. What the Court did was,—not to import an element into the claim, but—to determine from the specification and from the prior art the meaning of an element " the yielding packing M " *expressly recited in the claim.* This the Court, according to the decision in this *Santa Clara Mill* case, and according to every other pertinent decision, is bound to do. Counsel for appellant have wholly lost sight of the important distinction between reading into a claim an element not specified, and ascertaining the meaning of an element expressly specified therein.

White vs. Dunbar, 119 U. S., 47. The facts are not correctly stated in the Brief for appellants. What this Court condemned in that case was the *reissue of the patent* for the purpose of *expanding the claim* to cover the device of a later inventor. The case is the reverse of what counsel contend, and is an authority against them. The Court held that the claim could not be expanded beyond the actual scope of the invention *as shown by the specification.* Counsel cite this case as authority for the proposition that the Court below erred in construing the words " yielding packing M " as signifying the yielding packing of asbestos and tallow which is *specifically described in the specification.* It is counsel for appellant who seek to treat the claim as a " nose of wax " to be pulled this way or that, regardless of what the actual invention is.

U. S. Repair Co. vs. Asphalt Co., 183 U. S., 591 :

The facts as stated in appellants' Brief (p. 71) and the quotation from the decision do not correctly represent the case and the conclusion of the Court. The material fact was that the process *described in the specification* and specified in

the claim was found to be substantially identical with the subject-matter of an earlier patent. Counsel for the patentee asked the Court to save the claim by reading into it a detail (a specific way of applying the heat) which was not, *according to the specification*, a feature of the patentee's process. Speaking of that detail this Court said (p. 600):

> "If it is a virtue resulting from a peculiar application of heat, there is nothing in the record to show that Perkins was aware of it. He certainly did not reveal it in the specifications of his patent nor describe it as part of his method."

The facts here are just the reverse of this. There is no earlier patent describing substantially the de Bange obturator, from which the patentee is asking the Court to save his claim by reading into it a detail not described in the specification as a feature of the invention. Furthermore, the pad of asbestos and tallow is set forth in the specification as the essential feature of "the yielding packing M." The *only other part* is the cover M^2 in which the pad M^1 is wrapped.

The words quoted by appellant's counsel as those of Mr. Justice McKenna are not his, but those of the C. C. A. quoted by him. What is, however, of much greater importance is the fact that those words *were not used of the claim of the patent*, as would appear from appellant's Brief, but of a claim which had been made in the application for patent, *and which the patentee had abandoned.* It was not a question of the power of the Court to enlarge or restrict the scope of *claims*, but of its power "to enlarge or restrict the scope of *patents*," which, by the mistake of abandoning a claim that need not have been abandoned, "were issued in terms too narrow or too broad to cover the invention." The Court said in the second sentence preceding appellant's misleading quotation:

> "Having *voluntarily abandoned* the claim for a method limited to the use of 'a blast of heat', the patentee or his assignee may not now insist that a broad claim, containing no suggestion of such intention, shall nevertheless be subjected by construction to the same restriction."

It should not be necessary for us to consume the time of the Court (and our own) correcting such misrepresentations as this, for which there can be no excuse, seeing that the same misrepresentation was made in the brief below (pp. 619, 620, Ct. Cl. Rec.) and was clearly pointed out in our brief in reply (pp. 693–695).

The cases of *Stearns vs. Russell* (85 Fed., 218) and *Paul Boyton Co. vs. Morris Chute Co.* (87 Fed., 225) do not support appellant's contention, but quite the contrary. In the first named case the patent claimed a tool for manual use in dipping pills. A prior patent showed the *same tool* used for another purpose. The patentee sought to have certain unnamed mechanisms—to wit, a fan, a flexible tube, and a gelatine tube—read into the claim as elements. Of course, the Court declined so to do.

In the second case the Court distinctly held that

> " if interpretation of the claim were requisite, the specification might of course, be resorted to for the purpose of arriving at a better understanding of its meaning."

But this is exactly what appellant objects to in the present case. Counsel charge the Court below with error in doing what the Court in the case cited says might " of course " be done.

Penfield vs. Potts (126 Fed., 475). In that case the Court very properly said there was " no authority for reading into a claim features which have been omitted." But the Court said :

> " We may beyond doubt look to the specification and drawings for the purpose of understanding the claims, or that we may see whether the device is useful or operative, and sometimes for the purpose of limiting a claim to the particular device described, but we may not enlarge a claim by including therein elements which are not claimed as such."

It seems strange to us that counsel for appellant are unable to perceive how completely this decision cuts the ground

from under both of their contentions (the "narrow" view and the "broad" view) regarding claim 1 of the deBange patent, and fully sustains the judgment of the Court below.

We deem it unnecessary to discuss in detail the other decisions of the Circuit Courts cited in Appellant's Brief. We have examined them all, and assure the Court that they do not sustain the contention of our opponents.

Counsel for appellant charge the Court below with inconsistency in that they "read into claim 1 the asbestos and tallow composition" and refused to read into it "the copper shells and brass shells" (see Brief for United States, p. 79, and elsewhere). They argue that if it be proper to interpret the words "the yielding packing M" as including a composition of asbestos and tallow, it should be proper to interpret those words as including also a copper envelope and brass shells. The flaw in this reasoning is easily detected. In the first place, the "*rigid*" brass shells M^3 (claim 3) cannot possibly be regarded as a part of "the *yielding* pad M," for that is expressly said to consist of only two parts, namely, the tough yielding body M^1 of asbestos and tallow, and the cover envelope there of M^2. There remains, therefore, only the question why should not the copper envelope be regarded as an essential element of the yielding pad M. As to that, the undisputed *fact* is that the composition of asbestos and tallow is the very essence of the "yielding pad M." No other known material would answer the desired purpose and perform the required function. On the contrary, the material used for the envelope of the pad is not an essential matter. Whether the cover be of one material or another is of no importance, so long as it serves to hold the mass together; and indeed it appears that, even after "the tearing of the cloth, the apparatus, all presumptions to the contrary, continues to work without great difficulty" (Tr., p. 37).

We submit that there is no merit in appellant's criticisms of claim 1 of the deBange Patent.

The Court will notice that the opinion of the Court below contains no reference whatever to the "broad" theory of interpretation of claim 1, which occupies so large a space in appellant's Brief in this Court. This circumstance is worthy of an explanation. As already stated, counsel for defendant below conceded that the case was within the doctrine of the Palmer

and Berdan cases until, by a type-written interpolation in the third Brief for defendant, it was claimed that this Court had modified said doctrine in the later cases of Russell and Harley (Ct. Cl. Rec., p. 521). The sole defense presented in the briefs for final hearing below (except for the type-written interpolation mentioned above) consisted in the proposition that claim 1 of the patent ought to be so narrowly interpreted as not to cover the deBange obturators used by the United States. That proposition was elaborately presented in a brief of one hundred and forty pages (Ct. Cl. Rec., pp. 327–468). This explains why the Court below say that

> " The material issue involved is the precise limit or scope of claimant's patent as appears from specifications and claim 1 of his letters No. 301,220 " (Tr., p. 62).

The idea that the claim was fatally *broad* had not, up to that time, occurred to anyone. The question of jurisdiction, however, was fully argued orally, and is discussed in the opinion of the Court below.

After the decision of the Court below, defendant filed a motion for a new trial, and the main ground of that motion was the proposition that, if the words " the yielding packing M " did not make the claim fatally *narrow* they made it fatally *broad*. The Brief of Appellant in this Court, so far as it relates to the " broad " theory, is substantially a reprint of the Brief in Support of the motion for new trial below. The Court in overruling that motion did not file an additional opinion.

The situation is not without an element of humor. Counsel for the defendant, having rested their case on the proposition that the legal effect of the words " the yielding packing M " was to render the claim fatally *narrow*, summoned the courage to ask for a new trial on the ground that *the Court had erred* in not holding that the legal effect of those very words was to make the claim fatally *broad*. In commenting on this change of view we said in our brief in opposition to the motion:

> " We recall something like this remarkable change of view in a well-known colloquy:
>
> " ' HAMLET: Do you see yonder cloud that is almost the shape of a camel?

" 'POLONIUS: By the mass, and 'tis like a camel indeed.

" 'HAM.: Methinks it is like a weasel.

" 'POL.: It is backed like a weasel.

" 'HAM.: Or, like a whale.

" 'POL.: *Very* like a whale.'

" What is this new proposition as to claim 1 but an attempt to experiment with the Court? After having assured the Court that the thing under discussion was like a weasel, counsel now declares it is 'very like a whale.' But this Court is not playing Polonius to counsel's Hamlet."

From the foregoing it must be conceded to the credit of counsel for the Government that they have not failed to present to the Court every conceivable aspect of the case that could possibly turn to the advantage of the defendant.

FOURTH.

Compensation.

This Court has repeatedly held, as stated in decisions cited by the other side in opposition to our motion to remand for additional findings, that this Court is bound by the Findings of the Court below as to all matters of fact. Thus in United States vs. Smith, 94 U. S., 214, this court says:

" By our rules in reference to appeals from the Court of Claims, rule 1, section 2, that court sends here its finding of facts, as 'established by the evidence, in the nature of a special verdict'. The evidence is not sent up. This finding is conclusive, unless impeached for some error in law appearing in the record (p. 218).

" In the estimation of damages the Court of Claims occupies the position of a jury under like circumstances. Damages must be proved. The court is not permitted to guess any more than a jury, but, like a jury, it must

make its estimates from the proofs submitted. The result of the best judgment of the triers is all that the parties have any right to expect."

In all of the cases cited by Government counsel on this point, it appears that the purpose of the motion to remand was either to bring before this court the *evidence* on which the Court of Claims made its findings, or to direct the Court of Claims to *modify its findings* which it had made upon the evidence. Under the rules of this Court it is mandatory upon the Court of Claims to submit findings from the evidence before it on which it bases its conclusions. The latest authority on which we rely in support of our motion to remand is that of J. M. Ceballos & Co. vs. United States, 214 U. S., 47. In that case, as in this, the motion to remand was for the purpose of having the Court of Claims make findings from certain material evidence before it on which it had made no findings whatever. In that case also as in this, proper request had been made in the court below for such findings, which request was denied.

In the Ceballos case the subject-matter in question was a certain contract which had been offered in evidence, and a finding upon the same had been requested, but the Court made no finding whatever. Action upon the motion in that case was postponed until the hearing upon the merits. At that time it was conceded by the Government that the contract had been offered in evidence, that the representations concerning the same made by counsel for claimant were correct, and that it might be treated as in the record without calling for findings. Thereupon this Court treated the contract as part of the record and as the basis for a revision of the award of the Court of Claims, increasing the amount of the same from $5,391.25 to $205,614.37, or about forty times.

In the present case, notwithstanding the rule of this Court, that the Court of Claims shall make findings from the evidence upon which it bases its conclusion of law, that Court first refrained from making any award because there was no evidence in the record upon which the amount of damages or award could be predicated, and held the case on the docket pending the submission of evidence on that question. Then, after the evidence had been submitted, it made the arbitrary

award of $136,000, which had absolutely no relation whatever to the evidence. We submit, therefore, that we are clearly entitled to the benefit of findings by the Court of Claims on this question of value, unless the Government counsel shall make a like stipulation as in the Ceballos case with reference to the evidence certified to by the clerk of the Court of Claims appearing as the appendix to our first brief herein, or unless this Court shall follow the precedent established in the Berdan case and remand the case with directions to the Court below to enter judgment for an amount equal to a certain percentage (as may seem just to this Court) upon the cost of manufacture of the guns in which the patented device was used, as suggested in our first brief (pp. 12–14).

New York City, February 28th, 1912.

Respectfully submitted,

PHILIP MAURO,
TIMOTHY D. MERWIN,
Of Counsel for Appellee.

13

Supreme Court of the United States.

OCTOBER TERM, 1911.

Office Supreme Court, U.
FILED.
FEB 15 1912
JAMES H. McKENN
Cl

THE UNITED STATES,
Appellant,
vs.
SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL,
Appellee.
No. 209.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL,
Cross-Appellant,
vs.
THE UNITED STATES,
Cross-Appellee.
No. 210.

APPEALS FROM THE COURT OF CLAIMS.

BRIEF FOR CLAIMANT ON CROSS-APPEAL.

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Supreme Court of the United States.

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THE UNITED STATES, Appellant, vs. SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, Appellee.	No. 209.
SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, Cross-Appellant, vs. THE UNITED STATES, Cross-Appellee.	No. 210.

APPEALS FROM THE COURT OF CLAIMS.

BRIEF FOR CLAIMANT ON CROSS-APPEAL.

I.

Statement of Case.

The suit is for compensation for the use by the United States Government in its Breech Loading Guns of the invention covered by United States Letters Patent to C. T. V. M. DeBange, as assignor of claimant, No. 301,220, dated July 1, 1884, on Breech Loading Ordnance. The number of such guns, in which the Court of Claims has found that said inven-

tion was used, is 1518 (Tr., p. 61). The claimant filed its petition in the Court of Claims January 31, 1895 (Tr., p. 1), and subsequently, on April 12, 1909 (Tr., p. 8), filed an amended petition.

Upon the evidence submitted by both parties, the Court of Claims, on December 2, 1907, rendered its decision in favor of claimant, holding the United States liable to it for damages for such use, but naming no amount, as follows:

> "Upon the foregoing Finding of Facts the Court decides as a conclusion of law that claimant recover of and from the United States the sum of $----------".

In the last paragraph of the accompanying opinion the Court says:

> "There is no testimony in the record upon which the quantum of damages can be predicated. The measure of damages would be the value of the device to the defendants. Following the precedents heretofore established, the case will stand upon the docket, with leave to furnish testimony upon this point" (Tr., p. 66).

Pursuant to this ruling of the Court of Claims, counsel for claimant and the Government took and submitted the testimony of eleven ordnance experts, and a large amount of documentary evidence, on the question of the value of the invention of the patent in suit to the Government, and as to what would be a reasonable compensation for such use as the Court found had been made of it by the Government. The testimony alone on behalf of claimant comprises thirty-nine, and that for the Government eighty-seven, printed pages. This evidence was submitted to the Court of Claims upon printed briefs and oral argument, and was accompanied by a request by claimant for specified findings of fact based upon this evidence. Not only was this request absolutely ignored by that Court, but it made no findings whatever from the evidence in question, merely adding to its original conclusion of law, by filling into the blank space the amount of award as follows, viz.: One Hundred and thirty-six thousand Dollars ($136,000). Thereupon claimant moved for a new trial,

and renewed its request for findings on the question of value or reasonable compensation, in substantially the same form as originally presented. This request also was in turn ignored by the Court, nor even then were there any findings whatever made by it upon this evidence, as appears by the Transcript herein.

The Court of Claims thereupon, on the 20th day of May, 1909, entered the following judgment:

> "The court, upon due consideration of the premises, find in favor of the claimant, and do order, adjudge and decree that the said Société Anonyme des Anciens Etablissements Cail do have and recover of and from the United States the sum of one hundred and thirty-six thousand dollars ($136,000).
>
> "BY THE COURT."

The defendant in due course appealed from this judgment, whereupon claimant filed its cross-appeal.

Rule 1 of this court relating to appeals from the Court of Claims, provides that the Transcript of Record, upon which alone such an appeal can be heard in this court, shall contain, among other things,

> "a finding by the Court of Claims of the *facts* in the case *established by the evidence* in the nature of a special verdict, but *not the evidence establishing it.*" (Italics ours.)

Therefore upon the filing of the Transcript of Record in this court, claimant submitted its motion for an order as follows:

> "ORDERED: That the record in this case be remanded to the Court of Claims, and that said Court be instructed to find and certify to this Court as matters of fact in addition to the facts found and certified in said record;
>
> "FIRST. Whether or not in the record before the Court of Claims there are any communications from the War Department or Navy Department to the Court of Claims in response to said Court's call for the same, stating the cost of the guns in which said Court found

that plastic pad obturators were used by the Government of the United States between July 1st, 1884, and July 1st, 1901 (the term of the patent), and if so, to insert copies thereof in its findings:

"SECOND. Whether or not there appears in said record any evidence showing the amounts which the Government of the United States has paid, or has contracted to pay, for patented improvements in breech mechanism for ordnance, and if so, to include such amounts in its findings:

"THIRD. Whether or not there appear in said record any estimates of ordnance expert witnesses as to the value of the device of the patent in suit to the Government of the United States, or as to what would be reasonable compensation for its use by the Government of the United States as found by said Court, and if so, to insert the amounts of such estimates in said findings.

"FOURTH. That said Court of Claims strike out from its findings the extracts from the evidence comprising the following described portions of the Transcript of Record, viz:

"In Finding II, all on page 19; also the matter beginning with line 4 of page 21, and extending to and including the words, 'The guns then appreciably,' lost their accuracy,' line 16 page 28; and the extract from, 'Revue d'Artillerie' comprising the last four lines on page 28, all of pages 29, 30, and 31, and to and including line 18 on page 32;

"In Finding IV, the last 11 lines of page 32, and pages 33, 34, 35, 36, 37, 38, 39, and to and including the words, S. V. Benét, Brig. General, Chief of Ordnance,' lines 18 and 19 page 40; and the illustrations constituting page 41;

"In Finding VI all the matter from and including, 'The following correspondence,' line 9 from the bottom of page 43, to the end of said Finding."

This court thereupon ordered that the consideration of claimant's motion be postponed until the hearing of the case upon its merits.

II.

Assignment of Error.

The cross appeal herein is taken solely from that part of the judgment of the Court of Claims which fixes the amount of the award to claimant for the reason that said amount is inadequate in view of the evidence before that court upon the question of the value of the patented invention to the United States Government. Affirmance of the judgment in all other respects is requested by claimant.

More specifically it is submitted that the Court of Claims erred;

(1) In not transmitting to this court any finding of the facts which were established by the evidence before it as to the value of the invention in question to the United States;

(2) In finding that the claimant should recover of and from the United States the sum of $136,000 only, instead of such sum as the evidence before it justified, and as prayed for in claimant's amended petition; and

(3) In including in its findings the evidence specified in the fourth paragraph of claimant's motion hereinbefore set forth upon which the findings are based.

III.

Requested Additional Findings.

For the information of the court we have filed, and printed as an appendix hereto, certified copies of certain extracts from the evidence before the Court of Claims, which furnish the basis for the additional findings requested in our motion.

Under the first point of the motion, such requested findings would show that the Navy Department, upon call from the Court of Claims, stated the respective costs of the several calibers of breech loading guns in the Naval service, which, multi-

plied by the number of guns embodying the invention of the patent in suit as found by the Court of Claims (Tr., p. 61), would amount to $5,835,000; and that the War Department in like manner reported to that court that the cost of such guns issued to the Army was $12,536,263, or a total cost of $18,356,363 (Appendix, p. 16).

Under the second point of our motion the findings would show that the United States had theretofore contracted for the payment for the use of the so-called "Bofors" and "Welin" breech mechanisms each, a royalty of $400 per gun of 6" caliber and upwards (Appendix, pp. 20, 23, 25); for Gerdom's improvement on the invention of the patent in suit, the sum of $50,000 (Appendix, p. 24); for the present army magazine rifle the sum of $200,000 (Appendix, p. 25); for the soft-steel cap used on the point of armor-piercing shot and shell the sum of $150,000 (Appendix, p. 22).

Under the third point of our motion it would necessarily be found that the estimates of the expert witnesses fairly interpreted and compared, represent an average valuation greatly in excess of the amount of the award (pp. 10–12 *post*).

IV.

BRIEF OF ARGUMENT.

Findings.

The Court of Claims in finding from the evidence before it, that there was an implied contract on the part of defendant to pay claimant for the use of the patented invention, whereby that Court acquired jurisdiction of the suit, and that the patent is valid, and covers the device used by the defendant, is clearly right, and to this extent its judgment should be affirmed, but its judgment as to the amount of the award to claimant, should be revised and the case remanded with direc-

tions to increase the amount of the award to such sum as this Court shall find was the full value of the invention to the defendant.

As above set forth, the Transcript of Record contains absolutely no finding of fact from the evidence relating to the value of the invention to the Government, or the compensation due from the Government to claimant; nor is there a single word in said Transcript whereby the adequacy of the amount awarded claimant can be tested by this court. The Court of Claims had before it for its consideration the testimony of expert witnesses, probably of the most exhaustive, complete, and convincing character ever submitted to that Court upon the question of the value of a patented invention.

Extracts from Testimony.

There being no findings from the testimony of these experts, in order to properly present the matter to the Court, we will refer to the extracts from said testimony as set forth in the appendix hereto.

Of the eleven witnesses whose testimony was before the court, nine were commissioned ordnance officers of the United States Army or Navy, one a retired Rear Admiral, one a retired Brigadier General, two Colonels, two Lieutenant-Colonels, two Majors, and one Commander; of the two civilians, one was a professor of the United States Naval Academy, and the other was an expert in ordnance and explosives of international reputation.

The appended certified extracts from this testimony show clearly that the four witnesses testifying for claimant, although three of them were in the Government service, adequately appreciated the enormous value of the invention to the Government, and endeavored honestly to appraise the same, and to measure in dollars and cents the compensation due claimant from the Government for its use; while the defendant's witnesses as obviously strove to minimize the importance and value of the invention. Nevertheless, the average of the estimates of defendant's witnesses greatly exceeds the amount named by the Court of Claims, and a fair comparison of the estimates with the amounts which they testified that the

Government had paid for other far less important inventions in war material, will demonstrate to an unprejudiced mind how inadequate their estimates are.

Proper Method and Basis of Valuation.

The most flexible, scientific and accurate method of fixing the proper royalty for an essential patented part or feature of machines of different sizes and cost, is by a percentage of such cost, the importance of such feature or part increasing in even greater ratio than the increase of value or cost of the whole mechanism. A similar but less flexible and accurate plan is by a graduation of royalty based upon the sizes of the machines, without regard to their cost.

The first method is followed by three of claimant's witnesses, the second by claimant's other witness and by some of the Government witnesses, while others have named an arbitrary lump sum.

The thing upon which the estimates should be based, is the *whole patented invention*. This is claim 1 of the patent, which is a "combination" claim, or one covering a plurality of elements.

The settled rule of law is that whether such elements are partly new, or all old, their combination in new working relations is the result of an inventive act, and constitutes a *new patentable unit or entity* (1 Robinson on Pats. Sec. 155). It is also settled law that in fixing damages or compensation for the use of a patented combination, comprising a new element, if the other elements are not, or cannot, be used, and are valueless without it, the patentee is entitled to compensation for the *entire combination*, as distinguished from the case of a *mere improvement* upon a combination which is operative without the improvement, in which case the value or benefit of such improvement alone is considered (III. Rob. on Pats., Sec. 1062).

It is thoroughly established in this case that the breech mechanism for heavy guns embodying an interrupted screw thread block and a mushroom head, is not now, has never been, and cannot be, used, except with the DeBange plastic

pad. That this pad is the *essential, indispensable* part of the mechanism.

Hence the device on which the Court of Claims has awarded compensation to claimant is the full combination of claim 1 of the patent.

Claimant's witnesses were asked for and gave their estimates of the value, and also what would be reasonable compensation for the use of the real patented invention, *i. e.*, the combination of claim 1 of the patent. The Government counsel, under an evidently mistaken view of the law, attempted to segregate the plastic pad as the only new thing from the other elements of the claim, which were unsuccessfully experimented with before the time of DeBange, and the Government's witnesses were asked for and gave their estimates of proper compensation for the use of that part only.

The real invention is the "*yielding packing*" in combination with the *threaded plug*, the *headed pin*, and the *gun*. As found by the Court of Claims, the packing or pad is the *soul* or *vital part* of the organism, the new element which imparted vitality to the entire breech mechanism, and without which all the other parts are absolutely inoperative and valueless. With the pad they constitute, in co-operative relations, an efficient working machine; without it there can be no action whatever. It is not material how the fittings immediately surrounding and enclosing the pad are shaped, or of what material they are made, so long as they serve their designed purpose to confine and protect the plastic material of the pad.

The Government witnesses confined their estimates to the isolated pad of exactly the form and with the *specific cover and fittings therefor originally designed by DeBange.*

Considering their mental attitude, and the basis of their estimates of value or reasonable compensation, it is surprising (and to us exceedingly gratifying to see), how the opinions and valuations of the Government's witnesses confirmed those of claimant's witnesses. Were the estimates of the Government's witnesses placed upon the same thing as those of claimant's witnesses, the average valuation would be nearly as great, and some of their valuations would exceed some of those of claimant's witnesses.

Estimates of Claimant's Witnesses.

The certified extracts from the testimony of these expert witnesses show:

That Lieutenant Colonel Mitcham estimated the compensation due claimant as an amount equal to 6% of the cost of guns of 6" caliber and less, and 8% of the cost of guns above 6" caliber, which computed upon the number of guns in which the Court of Claims has found the invention was used by the defendant, viz. 1518, amounts to more than $1,400,000 on the complete patented invention:

That Lieutenant Colonel Lissack estimated as reasonable compensation, 5% on the cost of such guns, or a total of over $900,000:

That Mr. Maxim estimated such compensation as 7% on the cost of the guns, or over $1,200,000: and,

That Admiral O'Neil, following the other method of computation above referred to, fixed graded sums for various calibers of guns, which make his total estimate over $550,000 or approximately 3 per cent. on the cost of said guns. In making his estimate he said,

> "I have been largely guided by a sense of duty and obligation to the Government as one of its officers, and while I am a witness for the claimants, I have been unable to divest myself of the fact that I am under moral obligation to the Government to protect its interests, and yet I desire to be fair and liberal to claimant, and I consider the figures I have given are fair to both parties, and I believe they are considerably less than they expect or hope I would recommend."

Estimates of Defendant's Witnesses.

The witnesses for the defendant following the line of questioning of defendant's counsel, as above stated placed their estimates of value on the *plastic pad* segregated from the other elements of the combination, or with the exact fittings shown in the De Bange patent drawing unmodified. Their estimates consequently run proportionately lower than those of claimant's witnesses.

This proportion was clearly defined by one of the Government witnesses, Colonel Birnie, who fixed the ratio of value of the plastic pad to the whole mechanism covered by the patent claim, as one to four, and his valuation of $200,000 is based on that part alone. This seems a reasonable ratio, and the estimates of all of the defendant's witnesses on the single element of the plastic pad, should be multiplied by four to determine what their estimates would have been if they had been asked to estimate the value of the entire combination of the patent claim.

The estimates of the several witnesses for the defendant *limited to the plastic pad* are as follows:

Prof. Alger, $100 per gun, or a total of $151,800, or multiplied by four, over $600,000:

Commander Chase, $150 per gun of 4 and 6 inches caliber, and $200 per gun of 8 and 13 inches caliber, or about $275,000 or multiplied by four, over $1,100,000:

General Smith, $85 per gun, "quite reasonable," and $100 per gun "very liberal," his maximum estimate being the same as Prof. Alger's:

Colonel Birnie, $200,000 or multiplied by four according to his own estimate, $800,000:

Colonel Heath, $100,000 "fair compensation," and $150,000 "liberal award," or the latter multiplied by four, $600,000:

Major Montgomery, $100,000, or multiplied by four, $400,000:

Major Hoffer, graded prices for different calibres of guns amounting to $190,000 or multiplied by four, $760,000.

Synopsis of Estimates.

These multiplied estimates range from something over two per cent. to six per cent. of the cost of the guns, as compared with the percentages of the claimant's witnesses, which range from three per cent. to eight per cent.

When the enormous value of the patented invention in question is compared with the prices paid by the Government for other ordnance material, as testified by these witnesses, of $400 per gun for the Bofors breech mechanism,

and the Welin breech mechanism; $150,000 for the steel cap for armor-piercing shells ; $200,000 for the present type of army rifle, and $50,000 for Gerdom's improvement on the DeBange invention, the largest of all the estimates of these expert witnesses seems very conservative.

Without considering the different basis of calculation adopted by the defendant's witnesses, the average of all estimates amounts to a minimum of over $447,000 and to a maximum of nearly $484,000. Averaging the estiimates of claimant's witnesses in one group, and those of the defendant's witnesses in another group, and combining these, makes a total mimimum of about $620,000 and a total maximum of $630,000.

In other words, from any possible interpretation or comparison of the estimates of these highly skilled experts to determine their consensus of opinion, the resulting valuation is many times that foundby th e Court of Claims.

The prior contracts of the defendant for war material and these expert estimates, constitute the only evidence which the Court of Claims had before it to enable it to reach its estimate of the value of the invention to the defendant. It then fixed the arbitrary amount of $136,000 which obviously bears absolutely no relation to this evidence. The mere statement of this fact suffices to demonstrate that the award is grossly inadequate, and that justice to claimant demands its revision by this court.

In order that this court may be so advised as to the facts, that it may intelligently revise the reward of the Court of Claims, assuredly such findings as claimant asks for should be before it for its consideration. It cannot be disputed that the findings as they now stand are seriously defective under the rule of this court, and should be supplemented by proper additional findings.

Revision of Award Without Additional Findings.

It is easy, however, even upon the findings as they now stand, to show that the amount of the award is utterly inadequate, and disproportionate to the value of the property whereof the United States has had the use and benefit during the entire lifetime of the patent.

The Court will take judicial notice of the fact that the land and naval armaments of the country include many hundred guns, whose cost runs into many millions of dollars, and on whose efficiency in time of war (as in the recent Spanish War), vast issues depend. In every one of those weapons the de Bange obturator is a vital element. That the value of that device, upon the lowest basis of computation, is many times the amount of the award is evident upon a moment's consideration.

It appears by the findings, and is a matter of common knowledge, that the development and testing of an obturating system involves many years of trial, under all possible service-conditions. Of necessity many thousands of shots must be fired, involving enormous expense and the time and labor of many persons. And all this expenditure might result in merely demonstrating a failure. The Court will take judicial notice of the fact that the cost of such a series of experiments would amount to many times the amount of the award. The United States received from the Claimant a system *perfected and demonstrated;* so much so that this system has been found, in twenty-five years of service, practically incapable of improvement. This saving is *additional* to the actual value of the invention itself.

The case of U. S. vs. Berdan Fire Arms Co., 156 U. S., p. 552, upon which the Court of Claims relied in deciding this case in claimant's favor, furnishes a precedent which may enable the matter of compensation to be settled in an equitable manner without remanding the case for further findings.

In that case, the patented device was an extractor-ejector for ejecting the cartridge-shell from the rifle. Its function in the weapon is relatively of small importance compared with the function of the obturator for breech-loading cannon. Moreover, the Berdan extractor-ejector was one of a large class of such devices which are capable of being used for the same purpose; whereas the De Bange obturator stands practically alone. Nothing is or has been in existence which our Ordnance authorities would accept as a substitute, even though millions of dollars might be saved thereby.

In the Berdan Case, this Court approved of an award equal to 5 per cent. of the selling price of the weapons wherein the patented device was used. The selling price is, of

course, *considerably more* than the manufacturing *cost* of an article. Five per cent. of the selling price of such an article as a rifle would be about 6 per cent. to 7 per cent. of its manufacturing cost, which would have to be taken as the basis of calculation in the present case, since the Government makes its cannon in its own shops.

Moreover, it is apparent that this Claimant should be awarded a higher percentage than that awarded for the Berdan device.

The decision of this Court in the Berdan case establishes the rule that a proper method for determining the amount of reasonable compensation, in a case like the present, is to calculate a reasonable percentage of the article wherein the patented invention has been used.

We therefore submit that substantial justice could be done by remanding this cause with directions to the Court below to enter judgment for an amount equal to from 6 per cent. to 8 per cent. of the cost of the guns upon which the patented invention has been used during the lifetime of the De Bange patent.

Conclusion.

The judgment of the Court of Claims should be affirmed as to the liability of the defendant to pay damages to the claimant. It should be overruled as to the amount of the award of such damages. This award should be revised to conform to the evidence before the Court of Claims showing the amounts which the Government has heretofore paid for kindred inventions, and the estimates of value of the invention by the expert witnesses, or by following the rule laid down by this court in the Berdan case, and the case remanded to the Court of Claims to enter judgment in accordance with such revision.

New York City, February 2, 1912.

Respectfully submitted,

PHILIP MAURO,

TIMOTHY D. MERWIN,

Counsel for Claimant-Cross-Appellant.

APPENDIX.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1911.

THE UNITED STATES, Appellant, vs. SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS CAIL.	No. 209.
SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS CAIL, Appellant, vs. THE UNITED STATES.	No. 210.

Extracts from the Evidence in the Record of the Above Entitled Case in the Court of Claims.

Record, Page 17.

"NAVY DEPARTMENT,
WASHINGTON, August 5, 1895.

SIR: Referring to the call of the Court of Claims, dated the 25th ultimo, in the case of the Societe Anonyme Des Anciens Etablissements Cail vs. The United States, No. 18796, I enclose herewith copies of drawings, Nos. 4386 and 7564, of the breech mechanism employed with the service 6-inch breech-loading rifle, illustrating the gas check in use in the Navy, and have to state as follows in answer to the inquiries made in paragraphs Nos. 2, 3 and 4 of the rule of the court, viz: 2. * * *

3. The approximate cost of each of the guns of the various

calibers for which the gas checks shown in said drawings are used is:

4-inch B. L. R.	$3,000.00
5-inch B. L. R.	4,500,00
5-inch B. L. R.	6,000.00
8-inch B. L. R.	15,500.00
10-inch B. L. R.	27,500.00
12-inch B. L. R.	45,500.00
13-inch B. L. R.	65,000.00

4. * * * * * *

Very respectfully,
W. McADOO,
Acting Secretary,
C. H. P.

JOHN RANDOLPH, ESQ.,
Assistant Clerk, Court of Claims, Washington, D. C."

Rec. p. 812.

"WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
WASHINGTON, June 9, 1908.

SIR: In response to your call of the 4th instant (6072-36), in the case of Societe Anonyme des Anciens Etablissements Cail v. The United States, Court of Claims No. 18796, I have the honor to inform you that the following is the cost of the 1,223 rifles, mortars, and howitzers manufactured for the land service of the United States between July 1, 1884, and July 1, 1901, employing the DeBange gas check, to wit:

362	3.2-inch rifles, at $1,022 each	$369,964
25	3.6-inch rifles, at $1,169 each	29,225
44	5-inch siege rifles, at $2,306 each	101,464
61	7-inch siege mortars at $1,351 each	82,411
41	7-inch siege howitzers, at $2,733 each	112,053
94	8-inch rifles, at $12,327 each	1,158,738
127	10-inch rifles, at $23,458 each	2,979,166
115	12-inch rifles, at $36,306 each	4,175,190
354	12-inch mortars, at $9,938 each	3,518,052
	Total	12,526,263

Very respectfully,
WILLIAM CROZIER,
Brigadier General, Chief of Ordnance.
THE CHIEF JUSTICE OF THE COURT OF CLAIMS,
Washington, D. C."

Deposition of Lieut. Col. O. B. Mitcham, for claimant, Rec., pp. 773 and 774:

"12 Question. From your expert knowledge and experience what, in your opinion, was the value of the DeBange fermeture to the United States Government during the period from July 1, 1884, to July 1, 1901?

"Answer. That is a rather a difficult question to answer. Governments in adopting an invention pertaining to national defense do not generally count the cost in dollars and cents. In case of war some special invention might be of such a value as to determine in a pitched battle defeat or victory. From my knowledge of what has been paid by our Government for the use of patents bearing upon military inventions, I should say that an amount equal to 6 per cent of the actual cost of the guns of 6-inch caliber and less in which the DeBange fermeture is used would be a fair allowance. Above 6 inches, 8 per cent of the value is deemed a reasonable allowance.

"13 Question. Do you mean by this answer that the value so estimated would be a reasonable compensation to the patent owners for use of the invention by the Government?

"Answer. I think so."

Deposition of Hudson Maxim, for claimant, pp. 786 and 787:

"6. Question. From your expert knowledge in respect to guns and other war material, and particularly your knowledge of the DeBange system, what, in your opinion, was the value of the DeBange system to the United States Government during the period from July 1, 1884, to July 1, 1901?

"Answer. With an invention like the DeBange system of fermeture it is exceedingly difficult to form an opinion. It is different than with inventions for commercial uses. The DeBange breach fermature has been practically an indispensability to the United States Government in view of what other governments were doing at the time of its adoption by this Government and have since done. The life of a government itself may depend upon the proper functioning of large guns, and the difference between an invention which has been proven and tried out as a fermeture for breech mechanism is of incalculable value compared with an invention that has not been tried out.

It seems to me to be fair to appraise the value of the DeBange invention on a royalty basis of similar percentages of royalty to what the Government has been in the habit of paying for other ordnance inventions in other war materials. It is not uncommon for this Government to pay all the way from 5 to 8 per cent. and sometimes considerably higher royalties for important ordnance inventions, torpedo inventions, and the like. I should think, therefore, that, in view of

the practical indispensability of the DeBange system of fermeture, the royalty for the use of that invention should be equal to the highest royalty that the Government has paid for other inventions in war materials. When I refer to the DeBange system of fermeture, I refer to a gun equipped with that system of fermeture, and therefore I should deem 7 per cent. a very moderate royalty on the total cost of the gun."

Deposition of Rear Admiral, Retired, Charles O'Neil, for claimant, pages 798, 799:

"3. Question. Please state from your expert knowledge of the subject of ordnance generally and in particular of the DeBange system of fermeture, what, in your opinion, was the value of the DeBange invention to this Government for its use in its ordnance during the period from July 1, 1884, to July 1, 1901, and also what in your opinion would be a fair royalty or reasonable compensation for the Government to pay to the owners of the DeBange invention and patent for the use of the same during that period, stating your reasons for your conclusion?

"Answer. It is very difficult for me to express an opinion as to the value of the invention, which, however, is unquestionably very great. So far as concerns a fair compensation to be paid to the claimant for the use of their device, that is a different question. And I base my reply upon what I should probably have done after mature consideration had the matter come before me for settlement while I was Chief of Ordnance. In conducting transactions of this kind for the Government it was always my effort to make as good terms as possible for the Government, and I regarded it as a commercial transaction in which one party had something to sell and the other party was a possible purchaser. Since this case has been brought to my attention and I knew that I would be called upon to appear as a witness, I have considered very carefully what in my judgment would be fair to the claimant and to the government, and I have arrived at the following conclusion: That the most equitable form of settlement would be the payment of a fixed royalty upon guns of different caliber.

(Counsel for the defendant interrupts the witness to ask from what he is reading).

(Witness resumes). I am reading from a memorandum which I have made to use to refresh my memory in case I should require it. I do this because there are several figures named which I might possibly confuse. No one but myself has ever seen this memorandum or is aware of its contents.

I think that a royalty of $500. each for 12 and 13 inch guns, of $400. each for 8 and 10 inch guns, of $300 each for 4, 5, 6, and 7 inch guns, and of $200. each for guns of less than 4 inches in caliber would be a proper royalty to pay. I

arrived at this decision from a knowledge of other cases with which I have had to deal as Chief of the Bureau of Ordnance and of similar cases which have been brought before me, and I have been largely guided by a sense of duty and obligation to the Government as one of its officers, and while I am a witness for the claimants, I have been unable to divest myself of the fact that I am under moral obligations to the Government to protect its interests, and yet I have desired to be fair and liberal to the claimant, and I consider that the figures that I have given are fair to both parties; and I believe they are considerably less than they expect or hope that I would recommend."

Deposition of Lieut. Col. O. M. Lissak, for claimant, pp. 802, 803, and 897.

"3. Question. From your expert knowledge of ordnance matters generally, and in particular to the BeBange system of fermeture so-called, what, in your opinion, was the value of the DeBange invention to this Government for the use of the same in its ordnance during the period from July 1, 1884, to July 1, 1901, and also what, in your opinion, would be a fair royalty or reasonable compensation for the Government to pay the owners of said invention and the patent covering the same, for the use of the same during that period, giving your reasons for your conclusion?

"Answer. In reply to the first part of the question, as to the value to be placed on the invention, I would say that it would be impossible for me or anybody else to put a monetary value on an invention that was needed in the military service of this country for the defense and protection of the country, such an invention being invaluable to the Government. The Government when collecting its military material looks about for that which is best, and arriving to the conclusion as to what its service needs, the Government, in its military service, adopts the best. As to what might be a fair compensation to the inventor for the use of this breech mechanism, I have, after giving the subject very careful consideration, arrived at the conclusion that a remuneration equal to 5 per cent. of the cost of the guns in which this invention has been used would not be an excessive charge to this Government. I have found in looking over the royalties now paid by the Government for breech mechanisms that the Bofors mechanism receives a royalty which if applied to all the guns that had the DeBange mechanism, and that were made between the years that marks the life of this patent, that the percentage received by Bofors would be about 3½ on the cost of the gun. The Welin block receives a royalty which, if similarly applied, would amount to, I think, 4¼ per cent. These two breech mechanisms are partial in character only. The Bofors mechanism uses the

DeBange plastic pad and mushroom head, and differs from the DeBange chiefly in the shape of the breechblock itself, the block being conical or spherical, or conical-spherical, as you may call it, in place of cylindrical.

The Welin breechblock also uses the DeBange pad of asbestos and tallow and the mushroom head of the DeBange system, and differs from the DeBange block in the shape of the block itself. The threads on the Welin block are cut on surfaces that form a series of steps, while on the DeBange block the threads are cut on a cylindrical surface. It will be seen, therefore, that both the Bofors and Welin patents are effective in a larger gun only when they use the DeBange obturation. For this reason I consider that the DeBange patent which covers a complete breech mechanism is entitled to a higher compensation than should be granted for patents that cover similar mechanisms that are only partial in kind. In view, however, of the fact that DeBange breech mechanism has been used in practically all of the guns which were made by or for the United States Government during the life of the patent, it appears to me that the compensation might be placed at a lower figure than would appear right if the patents were given limited use only. These considerations lead me to place 5 per cent. of the cost of the gun as a reasonable figure for the amount of compensation for the use of patents." * * *

"22. Cross-question. If the royalty paid by our Government for the use of the Bofors mechanism or the Welin mechanism, which mechanisms you have stated had the DeBange pad as an element, is, as you say, 3½ and 4½ per cent., respectively, should not the value of the single element of the so-called DeBange pad be less than the value of a mechanism such as these referred to, which uses this pad as one among other essential elements?

"Answer. No, I think not. The DeBange pad permits the use of the Bofors mechanism, of the Welin mechanism, or of any other shaped breechblock; without the pad the Welin mechanisms would be useless in larger guns, and the Bofors mechanism would also be useless in larger guns. These mechanism depend for their success upon the use of the DeBange pad. The DeBange pad, therefore, is the most valuable element of the mechanism."

Deposition of P. R. Alger, for defendant, p. 826:

"25. Question. Now, Professor Alger, having, as you have stated, carefully studied the testimony of the claimant's witnesses, and from your knowledge and experience in connection with ordnance devices and being familiar with the value thereof, please state what, in your opinion as an ordnance expert, is a fair and reasonable value of the so-called DeBange gas check, exclusive of the Davis and Gerdom im-

provements, assuming that our Government has infringed either the device as originally described by DeBange and shown in the model, or as described and shown in the patent in suit?

"Answer. I think that a fairer estimate of the value in a lump sum can be made than in any other way, and after giving the subject very careful consideration, and with every wish to avoid being prejudiced in favor of the Government, I have formed the opinion that a lump sum of $100,000 would be a very generous allowance to be paid by the Government for its use of gas checks held by the court to infringe the patent in suit. If it is essential to estimate as to the proper amount to be paid on each gun for the use of this infringing device, I should regard $100 a gun as an average royalty to be paid a very generous and ample allowance."

Deposition of Commander V. O. Chase for Defendant, pp. 830; 838; and 844.

"9. Question. In the instances to which you referred in your last answer, where the Navy Department acquired the right to use complete breech mechanisms, did those mechanisms include the use of a gas check? If so, what type?

Answer. The breech mechanisms, the right to manufacture which, together with other features stated, was acquired by the Government for $200,000, embraced the plastic pad with steel split rings. This breech mechanism is known as the Weelin breech mechanism. I can not recall now whether special reference was made in the shop license purchased by the Government to any particular form of gas check, but all of the features of the gas check were included in the drawings as produced by the grantor of the shop license, and these drawings included complete details of the gas check and with a plastic pad and steel gas check rings."

"10. Question. Was or was not the type of gas check, which was included as an element in connection with the complete breech mechanism, mentioned by you, of the type commonly known as the DeBange gas check?

Answer. It was."

"3. Question. In view of the investigation made by you, your knowledge and experience, and the opportunities mentioned in question 29, what would you consider to be a fair and reasonable price per gun for the use of the DeBange idea of gas check as originally shown and described by him or as shown and described in his patent in suit.

MR. MERWIN. Same objection as before.

MR. COLES. Defendant's counsel makes the same reply.

Answer. I should say that a price of $150 per gun for guns of 6-inch caliber and below and of $200 per gun for guns of 8-

inch caliber and above, would have been a fair and reasonable price."

"46. Cross Interrogatory. Do you consider the Weelin construction an improvement upon the DeBange type of breech mechanism?

Answer. I do not know of the DeBange type of breech mechanism.

"47. Cross-interrogatory. Do you consider the Weelin construction an improvement upon the breech mechanism shown and described in the DeBange patent in suit?

Answer. Yes."

"52. Cross-interrogatory. As the Weelin mechanism is constructed, could it be used without the DeBange idea?

Answer. Not at all."

Deposition of Brig. Gen. Retired, C. S. Smith, for Defendants, p. 861.

"13. Question. General, please state, based upon knowledge and long experience in connection with ordnance devices, your service in the ordnance office and at the proving ground and arsenals, and your opportunity to know of the efficiency of ordnance devices and the value thereof, what, in your opinion, would be a fair and reasonable price in a lump sum for this Government to pay for the use of the original DeBange invention or of the devices covered by the patent to DeBange; assuming that the Government has infringed said patent, independently of the value of the Davis and Gerdom improvements?

Answer. The fundamental principle of the gas check used by us is undoubtedly DeBange's; the application of that principle and making it a working success is mainly due to ourselves, which ought to be considered in arriving at an estimate of the compensations the inventor should receive. I have thought this matter over carefully and I have considered other cases where the Government has bought inventions outright, perhaps quite as valuable as the DeBange, and on that basis taking the number of guns of the army and navy, as near as I could get at it, something like 1,500 guns in all, during the period covered by the claim, I think $100 per gun would be very liberal. I think less than that, say $85 per gun, would be quite reasonable. The higher figure would in bulk amount to what was paid for the soft steel cap placed on the point of armor piercing shot and shell. The lump sum at the maximum above given would amount to a maximum of $150,000, and at the minimum to about $125,000."

Deposition of Col. Rogers Birnie, for defendants, pp. 868 and 869.

"15 Question. Colonel Birnie, after your study and investigation of this case and in view of your long experience in

connection with ordnance matters, what do you regard as a fair and reasonable compensation in a lump sum for the use of the gas check as originally described by DeBange or as shown in the DeBange patent, assuming that this Government has infringed said patent, without regard to the Davis and Gerdom improvement?

Answer. My estimate would be $200,000 in a lump sum.

16 Question. What would you consider as a fair and reasonable price per gun for the use of the so-called DeBange gas check as originally described, or as shown in the DeBange patent, assuming that we have infringed said patent, independent of the Davis and Gerdom improvements?

Answer. Arriving at the cost per gun and the lump sum just mentioned, I direct attention to my previous answers which make it plain to my mind that the only claim that can be made is that based upon the use of a mixture of asbestos and tallow for making a plastic pad. This plastic pad forms, we may say, an integral part of a breech mechanism and its value should bear a certain proportion to the value of the whole breech mechanism, or if a royalty is to be paid on the pad, he may receive a royalty proportioned upon that which should be paid for a complete breech mechanism. My judgment is that the plastic pad alone may be considered worth one-fourth that of the complete breech mechanism. After the United States Government had thoroughly tested the 6-inch Bofors gun and found it in all respects novel and satisfactory, except using this plastic pad, and including also a novel arrangement for semi-automatic breech opening, this company agreed to allow the Government to manufacture guns of 6-inch caliber and upward for a royalty of $400 per gun, which is, I believe, perhaps the highest or nearly the highest royalty that has been paid by the Government for breech mechanisms of a gun. Taking one-fourth of this will be $100, for 6-inch guns and guns between 4.7 inch and 6-inch caliber, and although the Bofors Company agrees that no higher royalty shall be paid for guns of larger caliber than 6-inch, I will admit that in view of the more expensive breech mechanism the royalty may be increased to $150 for 8 and 10-inch guns and $200 for 12-inch guns or larger caliber than 12-inch, and $50 for guns of smaller caliber than 4.7 inch. On this basis I am taking the number of guns on which royalty is claimed to be due, as contained in the opinion of the court, on pages 22 and 23; I make the round sum of about $200,000.

Deposition of Col. Frank Heath for defendant, p. 879:

"20. Question. Colonel Heath, please state to the court, based upon your knowledge and experience in ordnance matters, your opportunities for judging the effectiveness of

operation and the value of ordnanne devices, and as a result of your experience in connection with the device in question and investigation as to the value of this device preparatory to giving your testimony, what, in your opinton, would be a reasonable value in a lump sum for the use by this Government, assuming that we have infringed claim 1 of the DeBange patent, of the original DeBange invention as described and as shown in said patent, independent of the Davis and Gerdom improvements, giving your reasons for your answer.

Answer. In giving my estimate of the value of that portion of the DeBange patent which was used by the Government I do not wish to belittle the value of the plastic pad, which in my opinion was the only feature of the DeBange system that was actually used by the Government. It was a very important feature in the combination that we used, but, in my opinion the Gerdom feature is of equal importance in that the DeBange device would be useless without the Gerdom feature. Of course the Gerdom feature is in a sense useless without the plastic pad, but one is as essential as the other, in my opinion. I have very little knowledge of actual money values and I have to deduce my estimates from what has been done by others in authority. The Congress of the United States, after careful consideration and investigation, awarded to Mr. Gerdom $50,000 for the use of his invention. In making that award they took into consideration the fact that the development of the invention was made at the expense of the Government and under the direction of its officers. If it were not for that, I should say that $50,000 was a fair award to make for the use of that pad, but in view of the fact that the Government took the idea of this pad from the DeBange system and it is covered by his patent, I think the Government should double the value at least, of the award given to Mr. Gerdom. I should therefore say that $100,000 would be a fair compensation to the owners of this portion of the system that belongs to the DeBange patent, and that $150,000 would be a liberal award."

Deposition of Maj. Geo. Montgomery for defendants, pp. 885–887 inc.

"5 Question. The witnesses for claimant, with the exception of Admiral O'Neil, have estimated the value of the so-called DeBange gas check to be so much of a percentage upon the cost of the guns to which it was attached. What have you to say as to the correctness of such estimates based upon the percentage of the cost of the guns?

Answer. I can not find anywhere that the War Department contracts to pay a royalty on the basis of the percentage of the entire cost of an article into which certain features entered that have been patented. It is customary to pay a royalty on the basis of per rifle or per gun, and the amount of this roy-

alty depends largely on the calibers of the guns in which these patented features enter. There is no fixed rule, however, in this respect, but it is a general rule that the larger the caliber of the gun the larger the amount of the royalty.

I have in view a case wherein the department contracts to pay a royalty of $400 per gun for all calibers above 6-inch, but in this case the department has been only constructing 14-inch guns having these patented features, so that the royalty that would appear high for a 6-inch gun is relatively much lower for a 14-inch gun. The War Department sometimes contracts for a lump sum for the right to use certain patented features as in the case of the present magazine rifle. The department has agreed to pay $200,000 for the use of the patented features, but this $200,000 is paid as a royalty upon the guns as they are being manufactured. When the sum of $200,000 shall have been paid, payment of royalty ceases. I know therefore of no case where the payment of royalty appears as a percentage of the total cost of the gun in which these features appear. I would not consider this method of payment logical in any case, for to illustrate, the 14-inch gun, which is a more powerful gun than the 12-inch gun, really costs less to manufacture. It is logical that more royalty should be paid for the use of the patented features in a more powerful weapon, but under the percentage system a less royalty would in fact be paid.

6. Question. In the case to which you refer in your last answer, in which a royalty of $400 per gun was paid, and in the other case referred to by you, where a lump-sum royalty of $200,000 was being paid, what is the mechanism upon which these payments are made, and does it include as an element the use of the plastic pad obturator?

Answer. In the case of the purchase of the right to manufacture the present magazine rifle, for which the sum of $200,000 will be paid, the plastic pad does not enter into the construction of the rifle. In the other cases I understand that the contract covers the use of the plug known as the Welin block, which by its shape permits of the easy closing and opening of the breech mechanism. I do not understand that this $400 includes the right to the use of the plastic pad, this contract being dated December 22, 1905, and the DeBange patent having expired in 1901.

In the testimony of Colonel Lissak he refers to the Welin block as an example of the amount charged for royalty on the assumption that since the Welin block was not in general use, a higher royalty should be paid for the DeBange plastic pad, since its use was general. I do not agree with Colonel Lissak's analysis of the situation, for if the Government buys a patent to be used extensively it is reasonable to expect that it will give a lower rate per gun than when it buys the use of pat-

ented features to be used in limited cases only. The total amount, however, that will be paid for a patented feature in general use would be, however, higher than for the use of a patented feature occasionally used.

7. Question. I call your attention to the deposition of Admiral O'Neil, to the latter part of his answer 3, where he estimates royalties at so much per gun of varying calibers. Based upon yur knowledge and experience and your opportunities for judging of the value of ordnance devices, what would you say as to the correctness of the amounts therein estimafed, giving your reasons for your answer?

Answer. In estimating the value of a patent like the DeBange patent on the plastic pad I would be guided entirely by what the Government paid for the improvement which made it a success so far as cannon have been used until recently. I consider the Gerdom improvement is indispensable in making the obturator feature of the breech mechanism a success for the uses to which it was put. The Government paid for the Gerdom improvement $50,000. The Gerdom improvement was not as novel as De Bange's plastic pad. I consider the plastic pad as primary or basic and the Gerdom improvement as essential in its development. The novelty of the plastic pad appeals to me very much. It was certainly an original idea to produce obturation by means of a plastic pad; but the fact remains that until Gerdom perfected the system of obturation it was not one that could have been used in military service. In view of the novelty of the plastic pad and the fact that it is primary or basic, I consider that it has been worth to the Government about $100,000. I consider that Admiral O'Neil's estimates are very high. My understanding is that the Navy Department as a rule pays a higher royalty than the War Department for similar inventions. There is, however, no absolute method of arriving at the value of the invention. The value of a patent may often depend upon the standing of the owner. An owner who needs ready cash may frequently sell his patent for less than one who has considerable financial backing."

Deposition of Maj. Jay E. Hoffer for defendants, pp. 894–895.

" 13. Question. In view of your knowledge and experience and the opportunities you have had of ascertaining the effectiveness in operation and the value of ordnance devices, what would you say was a fair and reasonable price, either in a lump sum or upon the basis of so much per gun, for this Government to pay for the DeBange gas check as originally described by the DeBange and shown by his patent, assuming that we have infringed the patent, before it was improved by the Davis and Gerdom patents?

Answer. Under the conditions given in the question which I am asked to answer, I think that a royalty of $50 for each gun not exceeding four inches in caliber, of $75 for each gun above 4 inches in caliber and under 8 inches in caliber and a royalty of $175 for each gun above 8 inches in caliber would be a proper sum for the Government to pay to the owners of the patent in question. On the above basis, the lump sum would amount to about $190,000. In arriving at my estimate of the amount which I think should be paid for the use of the patent in question I have not only considered the question of royalty per gun, but also the lump sum which I think would be just compensation."

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1911.

THE UNITED STATES, Appellant, vs. SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS CAIL.	No. 209.
SOCIETE ANONYME DES ANCIENS ETABLISSEMENTS CAIL, vs. THE UNITED STATES.	No. 210.

U. S. COURT OF CLAIMS,
WASHINGTON, D. C.

JANUARY 12th, 1912.

I hereby certify that the above and foregoing are true and correct copies of extracts from the evidence forming part of the record in the above entitled case in the Court of Claims.

ARCHIBALD HOPKINS,
Clerk.

(Court of Claims Seal.)

Supreme Court of the United States

OCTOBER TERM, 1930.

THE UNITED STATES,
Appellant,
vs.
SOCIÉTÉ ANONYME DES ANCIENS ÉTABLISSEMENTS CAIL,
Appellee.

No. [illegible]

SOCIÉTÉ ANONYME DES ANCIENS ÉTABLISSEMENTS CAIL,
Appellant,
vs.
THE UNITED STATES.

No. [illegible]

APPEALS FROM THE COURT OF CLAIMS.

MOTION FOR CLAIMANT FOR REHEARING

IN SUPPORT OF MOTION

Supreme Court of the United States.

OCTOBER TERM, 1909.

THE UNITED STATES, Appellant, vs. SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL.	No. 793
SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, Appellant, vs. THE UNITED STATES.	No. 794

Please take notice that on April 25th, 1910, at the opening of the Court on said day, or as soon thereafter as counsel can be heard, the undersigned will present to the Court the motion for remand of the record in said case to the Court of Claims, copy of which is hereby attached.

New York City, April 12th, 1910.

Respectfully yours,

TIMOTHY D. MERWIN,

Counsel for Société &c. Cail, Appellee and Cross-Appellant,

No. 2 Rector Street,

New York City.

To HON. JOHN Q. THOMPSON,

Asst. Atty. Gen. of the United States, Department of Justice, Washington, D. C.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1909.

THE UNITED STATES, Appellant, vs. SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL.	No. 793.
SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL, Appellant, vs. THE UNITED STATES.	No. 794.

Appeals from the Court of Claims.

Comes now the appellee and cross-appellant and moves this Court for an order as follows,

ORDERED: That the record in this case be remanded to the Court of Claims, and that said Court be instructed to find and certify to this Court as matters of fact in addition to the facts found and certified in said record;

"FIRST. Whether or not in the record before the Court of Claims there are any communications from the War Department or Navy Department to the Court of Claims in response to said Court's call for the same, stating the cost of the guns in which said Court found that plastic pad obturators were used by the Government of the United States between July 1st, 1884 and July 1st, 1901, (the term of the patent) and if so, to insert copies thereof in its findings:

"SECOND. Whether or not there appears in said record any evidence showing the amounts which the Government of the

United States has paid, or has contracted to pay, for patented improvements in breech mechanism for ordnance, and if so, to include such amounts in its findings:

"THIRD. Whether or not there appear in said record any estimates of ordnance expert witnesses as to the value of the device of the patent in suit to the Government of the United States, or as to what would be reasonable compensation for its use by the Government of the United States as found by said Court, and if so, to insert the amounts of such estimates in said findings.

"FOURTH. That said Court of Claims strike out from its findings the extracts from the evidence comprising the following described portions of the Transcript of Record, viz:

In Finding II, all on page 19; also the matter beginning with line 4 of page 21, and extending to and including the words, 'The guns then appreciably lost their accuracy', line 16 page 28; and the extract from, "Revue d'Artillerie" comprising the last four lines of page 28, all of pages 29, 30, and 31, and to and including line 18 on page 32;

In Finding IV, the last 11 lines of page 32, and pages 33, 34, 35, 36, 37, 38, 39, and to and including the words, 'S. V. Benét, Brig. General, Chief of Ordinance', lines 18 and 19 page 40; and the illustrations constituting page 41;

In Finding VI all the matter from and including, 'The following correspondence', line 9 from the bottom of page 43, to the end of said Finding."

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL

By

PHILIP MAURO,

TIMOTHY D. MERWIN,

Its Counsel.

BRIEF.

The Court of Claims rendered its decision in favor of claimant herein and filed its Findings of Fact, Conclusion of Law, and Opinion on December 2nd, 1907. The Conclusion of Law as so filed reads as follows:—

> "Upon the foregoing Findings of Fact the Court decides as a conclusion of law that claimant recover of and from the United States the sum of $----------."

The last paragraph of the accompanying opinion is as follows:—

> "There is no testimony in the record upon which the quantum of damages can be predicated. The measure of damages would be the value of the device to the defendants.
>
> "Following the precedents heretofore established, the case will stand upon the docket, with leave to furnish testimony upon this point."

In the Transcript of Record before this court the language of the opinion quoted remains unchanged, but the Conclusion of Law has been changed by inserting the amount of award and now reads as follows:

> "Upon the foregoing Findings of Fact the Court decides as a conclusion of law that claimant recover of and from the United States the sum of One Hundred and thirty-six thousand dollars, ($136,000.00)."

The transcript of record contains not a word concerning the proceedings during the two years following the rendering of said decision, notwithstanding the fact that the record in the Court of Claims, on the question of value and amount of damages, is almost as voluminous as that of the other branch of the case. The fact is, and the transcript of record should contain findings to so advise this Court, that pursuant to the ruling of the Court of Claims in its opinion, counsel for claimant and the Government took the testimony of eleven ordnance experts, and a large amount of documentary evi-

dence, on the question of the value of the invention of the patent in suit to the Government, and as to what would be a reasonable compensation for such use as the Court found had been made of it by the Government. The testimony alone on behalf of claimant comprises thirty-nine, and that for the Government eighty-seven, printed pages. This evidence was submitted to the Court of Claims upon printed briefs and oral argument, and was accompanied by a request by claimant for specified findings of fact based upon this evidence of substantially the same scope as the findings proposed by this motion. Not only was this request absolutely ignored by that Court, but it made no findings whatever from the evidence in question, merely adding to its original conclusion of law, by filling into the blank space the amount of award. Thereupon claimant moved for a new trial, and renewed its request for findings on the question of value or reasonable compensation, in substantially the same form as originally presented. This request also was in turn ignored by the Court, nor even then were there any findings whatever made by the Court from this evidence.

Under the former rule of this Court, a party whose requests for findings were refused by the Court of Claims, could have them certified to this Court for review. Under the present rule, however, there is no redress for a party so aggrieved, unless the Court of Claims be ordered to certify to this Court the proper and necessary findings based upon the evidence before it.

The Government having appealed from the judgment of the Court of Claims, claimant files its cross-appeal, for the reason that the amount of award is deemed inadequate and not supported by the evidence as to value, and in order that this Court may be advised as to what facts are established by this evidence, claimant now makes this motion for an order that such findings be filed.

Rule I of this Court relating to appeals from the Court of Claims provides, that the transcript of record upon which alone an appeal is heard, shall contain among other things,

> " a finding by the Court of Claims of the *facts* in the case *established by the evidence* in the nature of a special verdict, but *not the evidence establishing it.*" (Italics ours.)

As claimant seeks the recovery of a money award only, it is obvious that the Court of Claims should make findings from the evidence as to value, in order to disclose the basis of, and the justification for, its award.

The evidence before the Court of Claims comprises official reports from the Army and Navy Departments stating the cost to the Government of the guns in which the invention of the patent in suit was used by the Government during the life of the patent, which reports were made in response to the call of said Court. The Navy Department states the number and cost of the guns in the naval service as follows :—

4,	4	inch	costing	$3,000. each,
2,	5	"	"	4,500. "
133,	6	"	"	6,000. "
81,	8	"	"	15,500. "
25,	10	"	"	27,500. "
16,	12	"	"	45,500. "
34,	13	"	"	65,000. ", (C. of C. Rec. pp. 18–811)

the total cost being $5,830,000.

The War Department reported the cost of such guns issued to the Army as $12,526,263. (C. of C. Rec. p. 812), making a grand total of $18,356,263.

This evidence forms the basis for the first proposed finding set forth in this motion.

There were also in evidence before the Court of Claims, certified copies of contracts which the Government had made with the owners of other patents on breech mechanism for ordnance, two of which have direct bearing upon the value of the invention of the patent in suit, since they were for mechanisms to be used in connection with that invention. These contracts were respectively for the so-called "Bofors" breech mechanism, upon a royalty of $400. each for guns of 6 inch caliber and over, and $240. each for guns of less than 6 inch caliber; and for the so-called "Welin" breech mechanism, upon a royalty of $400. each for guns of 6 inch caliber and over. (Claimant's Exs. 1 and 2, C. of C. Rec. p. 808). This evidence forms the basis for the second proposed finding of fact.

The testimony of expert witnesses submitted by claimant and the Government was probably the most exhaustive, complete and convincing ever submitted to the Court of Claims

upon the question of value of a patented invention. Nine of the eleven witnesses were commissioned ordnance officers of the Army or Navy, comprising one rear admiral, one Brigadier General, two Colonels, two Lieutenant Colonels, two Majors, and one Commander. Of the two civilians, one was a Professor in the United States Naval Academy, and the other was an expert in ordnance and explosives of international reputation.

Without setting forth the methods of computation or the amounts of the several estimates made by these witnesses, two of whom named minimum and maximum amounts, it is sufficient for the purposes of this motion to state, that the average of their estimates of the value of the invention in question, including the minimum estimates is over $477,000. and including the maximum estimates is nearly $484,000. The third additional requested finding is based upon these estimates of ordnance experts.

The award fixed by the Court of Claims bears absolutely no relation whatever to any of the evidence referred to in the three proposed findings, and in order that this Court can intelligently pass upon the adequacy of the award, it must have before it findings of this character as a guide, and such findings should be made as a matter of simple justice to claimant.

We alse request this Court to order that there be eliminated from the findings as they now stand in the Transcript of Record, all the evidential matter, which under the rules of this Court is required to be excluded from the findings of fact. By reference to the Transcript of Record it will be seen, that more than half of the matter in the findings is of this character, as covered by our motion.

The part referred to in Finding II. on page 19 of the Transcript of Record, is merely a list of various inventions and patents considered by that Court, and from which it deduced its Findings of Facts. This list clearly has no place in the findings. The rest of the matter in this finding which is asked to be stricken out, consists of translations of extracts from the French publication "Revue d'Artillerie," and falls within the prohibition of the rule.

The matter asked to be stricken out of Finding 4, is a public document of the War Department introduced bodily into the Findings. The matter asked to be stricken out of

Findings VI., consists of copies of letters, which were introduced in the evidence and which are out of place in the Findings.

If these various matters be stricken out of the Record the Findings would stand as follows:—

Finding I would remain unchanged;

Finding II would include the first three lines on page 21, and the paragraph on page 28 beginning with, "Before the date of DeBange's invention", and ending with, "The evidence discloses that the above invention was not successfully applied or used in field guns or cannon of large calibre, and is not now so used;"

Finding III would remain unchanged;

Finding IV would consist of the matter on page 40 beginning with, "The DeBange obturator", and all of page 42;

Finding V would be unchanged;

Finding VI would consist of the first two paragraphs on page 43, beginning with the words, "About the year 1884", and ending with, "reports of the secretaries of War and of the Navy";

Findings 7, 8, 9, and 10 would remain unchanged.

Conclusion.

It therefore appearing that at the hearing of this cause in the Court of Claims, claimant made formal requests for findings of facts substantially as it now requests this Court to order; that on the refusal of the Court of Claims to make such findings, claimant forthwith moved for a new trial and renewed its request for findings; that the findings as they now stand are plainly lacking in essential matters of fact, and include other matter not proper to appear therein; that such findings are material to the consideration of the case by this Court; and that claimant has shown due diligence in presenting this motion, it is respectfully urged that the same be granted.

New York City, April 13, 1910.

Respectfully submitted,

PHILIP MAURO,
TIMOTHY D. MERWIN,
Claimant's Counsel.

15

Office Supreme Court U. S.
FILED
APR 29 1910
JAMES H. McKENNEY,
Clerk.

Supreme Court of the United States.

OCTOBER TERM, 1909.

THE UNITED STATES,
Appellant,

vs.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL.

No. [redacted] 209

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL,
Appellant,

vs.

THE UNITED STATES.

No. [redacted] 210

APPEALS FROM THE COURT OF CLAIMS.

CLAIMANT'S REPLY BRIEF ON MOTION TO REMAND.

The objection to the motion on the ground that it is in effect an application for a writ of *certiorari*, relates only to form, and not to substance. If there be force in the objection, which we deny, then the informality can be cured by a slight change in the phrasing at the end of each paragraph of the proposed order as follows:

Change the last line of the first paragraph to read, "to find the amount of cost so stated"; change the last line of the second paragraph to read, "find the amounts so shown"; change the last two lines of the third paragraph to read, "said

Court, and if so, to find the amounts of such estimates." These changes claimant desires to have made in the form of the proposed order, if the Court deems the criticism a valid one.

In making this motion, counsel for claimant have adopted the form employed in the recent case of J. M. Ceballos & Co. vs. The United States, decided last term and reported in 214 U. S., 47, which evidently met the approval of this Court. The grounds for the motion herein are much stronger than those in that case, and the ruling in that case ought to be decisive of this, especially in view of the fact that none of the cases cited by Government counsel are in point. They all relate to cases distinctly different in character from the present one, and even if they were in point the later case should be considered as settling the practice of this Court.

In the Ceballos case the subject matter in question was a certain contract which had been offered in evidence, and a finding upon the same requested. The motion to remand was opposed, and action upon it was postponed until the hearing upon the merits. At that time it was conceded by the Government that the contract had been offered in evidence, and that the representations concerning the same made by counsel for claimant were correct, and that it might be treated as in the record without calling for findings. Thereupon this Court treated the contract as part of the record, and as the basis for a reversal of the judgment of the Court of Claims, which was instructed to increase its judgment in favor of the claimant from $5,391.25 to $205,614.37.

All of the evidence introduced on this branch of the case in response to the order of the Court, is comprised in three classes, and all is material and relevant:

First, official reports of the Executive Departments submitted in response to the call of the Court of Claims for the same, showing the number and cost of the guns embodying the invention:

Second, evidence in the form of certified copies of contracts and oral testimony of ordnance officers of the Government, showing the amounts of royalty which the Government has paid for other patented inventions: and,

Third, the testimony of qualified experts giving their estimates as to the value of this invention to the Government, or what would be a reasonable compensation for its use.

The first three paragraphs of the proposed order presented in our motion, are drawn to cover these three classes of evidence, but the Court of Claims having found the number of the guns embodying the invention, their cost only is now required, and the requested finding as to royalties paid by the Government for other inventions, is confined to breech mechanism for ordnance, as royalties paid for non-kindred inventions cannot be considered of material weight in fixing the value of the invention involved herein.

Counsel for the Government do not dispute the fact that the evidence referred to in our motion, was before the Court of Claims, nor that it is pertinent and material to the determination of the issues. The only specific objection is, that it is incomplete in not including evidence respecting the work done by ordnance employees of the United States in developing the invention. The answer is, that the expert witnesses, both of the Government and claimant, gave full consideration to that work in fixing their estimates of value.

The chief burden of the argument in opposition to our motion is that the findings of the Court of Claims are like the verdict of a jury and cannot be disturbed or inquired into. But this Court possesses and exercises the power to remand a case for additional findings whenever necessary to properly complete the record. In this case the Court of Claims acting as a jury, stated in its opinion that there was no evidence before it on the question of value, and held the case on the docket for the presentation of such evidence, but after receiving exactly the evidence called for, it made no finding whatever therefrom, nor any other finding which could serve as a basis for its award.

In this connection we note an error in the brief for the Government on page 2, where reference is made to the "evidence upon which the Court of Claims made its ultimate findings of fact as to the value of the invention in question," because no such findings were made, and it is for that reason that this motion is made.

As to the fourth paragraph of the proposed order. The matter referred to therein should be stricken out because its inclusion violates the rule of this Court. It is true that claimant's counsel in order not to appear to object to the fullest possible findings of fact, did consent that some of these

matters might be included, but accompanied this consent with the request that certain explanatory matter should be inserted with them, which request was not granted. As these matters appear in the record they present a partial, fragmentary, and misleading disclosure of the complete evidence upon which the Court made its findings, and reached its conclusion of law. As the findings on this branch of the case are adequate and sufficient, they ought not to be obscured or loaded down with other matter which has no proper place therein. The case should come before this Court exactly as the rule requires, viz: with full, clear, and adequate findings of all facts material to the issue, and necessary to disclose the basis, and justify the amount of award found, and free of all extraneous and improper matter.

New York, April 26th, 1910.

Respectfully submitted,

PHILIP MAURO,
TIMOTHY D. MERWIN,
Claimant's Counsel.

In the Supreme Court of the United States.

OCTOBER TERM, 1909.

THE UNITED STATES, APPELLANT *v.* SOCIÉTÉ ANONYME DES ANCIENS Etablissements Cail.	No. 793.
SOCIÉTÉ ANONYME DES ANCIENS Etablissements Cail, appellant, *v.* THE UNITED STATES.	No. 794.

BRIEF IN OPPOSITION TO MOTION FOR REMAND.

The motion filed herein is in effect an application for a writ of certiorari. It is contrary to the rules of this court relative to appeals from the Court of Claims, as well as being opposed to the precedents of this court established in a number of cases, and it should, therefore, be denied.

The matter set forth in first, second, and third paragraphs of the motion was carefully considered by the court below, which refused to incorporate the same in its findings. The appeal record shows no specific exception filed to the court's action in this respect, unless the cross appeal be in itself considered as such exception.

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This court will recognize, and doubtless disregard, the patent attempt to secure at this time the full effect of the matter recited in the first, second, and third paragraphs of the motion, by selecting certain portions of the evidence alleged to exist in the record of the court below and presenting them in detail in the brief to the exclusion of all other matters of evidence upon which the Court of Claims made its ultimate findings of fact as to the value of the invention in question. No reference is made in the brief to that class of evidence which was before the Court of Claims relative to the work required in developing the De Bange gas check by ordnance employees of the United States whose patented improvements materially affected the adoption of the type of gas check used in the service of this Government, the most important of which patented improvements were subsequently purchased by the Government from the representatives of Gerdom for the sum of $50,000.

In attempting to support the contentions set up in the brief not a single decision of this court, or any other court, has been cited.

Rule 1 of this court relating to appeals from the Court of Claims practically inhibits the allowance of such requests for findings as are set forth in the first, second, and third paragraphs of this motion, and it is pertinent to observe that the very argument which is made in the brief (p. 7) in support of the request set out in the fourth paragraph of said motion, relative to striking out "all the evidential matter,"

applies much more effectually to the matter requested in the first, second, and third paragraphs than it does to that in the fourth paragraph.

It is a well-settled policy of this court, particularly as to the amount determined and fixed as its judgment by the Court of Claims, that such a finding is in the nature of a special verdict and will not be disturbed by this court upon appeal.

In *United States* v. *Smith* (94 U. S., 214), the court, speaking through Mr. Chief Justice Waite, said:

> By our rules in reference to appeals from the Court of Claims, rule 1, section 2, that court sends here its finding of facts, as "established by the evidence, in the nature of a special verdict." The evidence is not sent up. This finding is conclusive, unless impeached for some error in law appearing in the record (p. 218).
>
> In the estimation of damages the Court of Claims occupies the position of a jury under like circumstances. Damages must be proved. The court is not permitted to guess any more than a jury, but, like a jury, it must make its estimates from the proofs submitted. The result of the best judgment of the triers is all that the parties have any right to expect.
>
> As the record presents the case, we see no error in the court below (p. 219).

In *McClure* v. *The United States* (116 U. S., 145), it was held:

> This court will not remand to the Court of Claims a case at law, with directions to return

> whether certain distinct propositions in requests for findings of fact, presented to that court at the trial of the case, are established and proved by the evidence, if it appears that the object of the request to have it so remanded is to ask this court to determine questions of fact on the evidence.

(See also pp. 148, 151, 152.)

In *Union Pacific Railway Company* v. *The United States* (116 U. S., 154), it was held:

> When the Court of Claims, on being requested by a party in a cause there pending to find specifically upon several facts which are only incidental facts and amount only to evidence touching the main facts in issue, and the court disregards the requests and finds the facts at issue generally, and judgment is entered, and the party whose request was denied appeals, this court will not remand the case to the Court of Claims, with directions to specifically pass upon each of said requests, or to make a finding of facts on the subject embraced in each of said requests (p. 154).
>
> * * * *
>
> Under our rule the facts are to be settled by the Court of Claims, and an appeal brings up for review only the decisions of that court upon questions of law arising in the course of the trial or in the application of the law to the facts as finally found. There is nothing unusual in this. In an ordinary suit at law the facts are settled in the trial court, and only questions of law are carried to the appellate court for review. Upon writs of error

> we hear the case only on findings of fact or exceptions to rulings of the court in the progress of the trial. Generally, in suits at law there is but one trial upon questions of fact (p. 157).

In *Stone* v. *The United States* (164 U. S., 380) the court, speaking through Mr. Justice Brewer, said:

> The findings of the Court of Claims in an action at law determine all matters of fact precisely as the verdict of a jury. (Act of March 3, 1887, ch. 359, pars. 2, 7, 24 Stat., 505; act of March 3, 1891, ch. 538, pars. 1, 4, 26 Stat., 851, 852; *Desmare* v. *United States*, 93 U. S., 605, 610; *McClure* v. *United States*, 116 U. S., 145.)

In *United States* v. *New York Indians* (173 U. S., 464) the court, speaking through Mr. Justice Brown, said:

> The motion contemplates an order upon the court to send up the testimony upon which it had found the ultimate fact that these three tribes were parties to the treaty, and inferentially for us to pass upon the sufficiency of that testimony to establish such ultimate fact. If the finding of these probative facts were deemed material within the case of *United States* v. *Pugh* (99 U. S., 265), application should have been made when the case was first sent here for a finding of such facts. In the Pugh case the Court of Claims found certain circumstantial facts, and the question this court was called upon to decide was whether those facts were sufficient to support the judgment. But this court did not

> hold that, where the Court of Claims was satisfied that the evidence before it fully established a fact, it was bound to insert all the evidence upon that point if the losing party thought the court made a mistake. This court has repeatedly held that the findings of the Court of Claims in an action at law determines all matters of fact, like the verdict of a jury, and that where there is any evidence of a fact which they find, and no exception is taken, their finding is final; *Stone* v. *United States* (164 U. S., 380); *Desmare* v. *United States* (93 U. S., 605); *Talbert* v. *United States* (155 U. S., 45); and in *McClure* v. *United States* (116 U. S., 145), this court distinctly held that it would not remand a case to the Court of Claims with directions to return whether certain distinct propositions, in requests for findings of fact, presented to that court at the trial of the case, were established and proved by the evidence, if it appeared that the object of the request to have it so remanded was to ask this court to determine questions of fact upon the evidence (pp. 470, 471).

In *District of Columbia* v. *Barnes* (179 U. S., 146) the court, speaking through Mr. Justice Day, said:

> This court does not sit to review findings of fact made in the Court of Claims. They are regarded as conclusive here, and our jurisdiction is limited to a determination of such matters of law as are properly brought to our attention upon the record. (*U. S.* v. *Smith*, 94 U. S., 214, 218, p. 150).

The Court of Claims, after an examination of all the evidence, followed its well-known and long-established practice in arriving at the amount of the judgment, and in this connection it may be pertinent to refer to a well-considered opinion by Judge Weldon as to the method which that court employs in determining the amount of judgment in this class of cases.

In *Moore* v. *The United States* (25 Ct. Cls. R., 82, 86) it is said:

> The findings of the court as to amounts are analogous to the verdict of the jury in the trial of causes in the common-law court; they reach ultimate and final results in a consolidated and specific amount. This is upon the principle of legal philosophy that all items are in law concluded by the ultimate findings, and the specific result as to each item is wholly immaterial to the administration of the law in the settlement of controversies between parties.

THE FOURTH PARAGRAPH OF THE MOTION.

As to the matter stated in this paragraph of the motion, it will be seen by an examination that it relates to material facts properly set forth in the findings and having a close relation to the questions of law to be determined by this court on appeal, and is not mere "evidential matter," in the same sense as the estimates of the amounts requested in the first, second, and third paragraphs of the motion, alleged to be part of and selected from the mass of evidence relative to the value of the invention in question.

It is denied on behalf of the United States that any proper basis for this fourth request was made in the court below or appears in the record on appeal here.

The matter on page 19 of the appeal record (objected to, pp. 3 and 7 of the brief on motion) is the statement of the prior art. In the court below the claimant consented to the inclusion of the specifications and drawings of the prior patents referred to in Finding II. (Ct. Cls. R., pp. 631, 640.) The prior art as constituted by patents and printed publications is manifestly a proper part of the record on appeal before this court. The function of this finding is merely to enumerate the prior art for the information of this court. The application of the prior art to the questions of law involved in the appeal being a matter determinable by a comparison of documents, this court can clearly consider the same in accordance with the principles set forth in the following cases:

Singer Manufacturing Co. v. *Cramer* (192 U. S., 265).

Heald v. *Rice* (104 U. S., 737).

Market Street Cable R'y. Co. v. *Rowley* (155 U. S., 621, 625).

The matter on pages 21–28, appeal record (objected to pp. 3 and 7, brief on motion) is an article from a French publication relative to the progress and development of ordnance, and has a material bearing upon the history of the development of gas checks or obturators for breech-loading guns. The

facts stated therein are of the same character as those stated in the article in volume 13 of the same publication (pp. 28–32, appeal record). In the court below claimant consented to the inclusion in Finding II f the article from volume 13, Revue d'Artillerie (Ct. Cls. Rec., pp. 96, 473, 514), and while objection was made to the request of the United States to have this finding include also the article from volume 12, Revue d'Artillerie, yet no formal exception to the action of the court below in making this article a part of this finding was entered of record. The appeal record should, therefore, stand unchanged.

As to the matter in Finding IV (pp. 32–39, appeal record) which is requested to be stricken out (pp. 3, 7, 8, brief on motion), it is respectfully submitted that inasmuch as the claimant in the court below consented to the inclusion in this finding of this article appearing in Ordnance Notes No. 292 (Ct. Cls Rec., pp. 764, 765, 1072, 1102), no proper objection to said matter can be made in this court at this time.

As to the matter in Finding VI (pp. 43–47, appeal record) which is requested to be stricken out (pp. 3 and 8, brief on motion), it will be seen that this part of the finding states facts which are material to the determination of the legal question as to whether there was any such understanding between the parties as must exist in order to constitute the basis for an implied contract and thereby determine the jurisdiction of the Court of Claims. The reason underlying the motion, for seeking to eliminate this

matter, is obvious, but is not a proper one, because the matter appears upon its face to be material to the determination of one of the legal issues involved, and this request should therefore be denied. In the court below the claimant substantially acquiesced in the inclusion of this matter in the findings and even contended that it was "favorable to the claimant." (Ct. Cls. Rec., 766.) Some of this correspondence was inserted in this finding by the Court of Claims at the request of the claimant. (Ct. Cls. Rec., pp. 1073, 1074, 1075; bottom of 1091; top of 1092.)

In conclusion, it is respectfully submitted that the grounds stated in support of the motion are not well founded, in view of the well-established precedents of this court, and that each and every of the requests set forth in the respective paragraphs of said motion should be denied.

JOHN Q. THOMPSON,
Assistant Attorney-General.

MALCOLM A. COLES,
Attorney.

LLOYD W. BOWERS,
Solicitor-General.

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THE UNITED STATES *v.* SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL.

SOCIÉTÉ ANONYME DES ANCIENS ETABLISSEMENTS CAIL *v.* UNITED STATES.

APPEALS FROM THE COURT OF CLAIMS.

Nos. 209, 210. Argued March 12, 13, 1912.—Decided April 8, 1912.

In order to find that there was an implied contract for use of a patent, there must be use with patentee's assent and agreement to pay something therefor, *United States* v. *Berdan Fire Arms Company*, 156 U. S. 552, and these elements may be collected from conduct of the parties, even if there are no explicit declarations.

Where the facts show that the patentee consented that the Government use his invention, and the proper officers of the Department in which it was used have stated that there is a claim for royalties if the patent is a valid one, the claim is founded on contract and the Court of Claims has jurisdiction.

The intention to plainly do a wrongful act by deliberately taking the property of another without compensation will not be imputed to officers of the United States without the most convincing proof.

The excellence of an ordnance invention is testified to by its use by the Government in guns for the national defense.

In this case, *held* that the De Bange gas check for large guns is a device of excellence, that the patents therefor are valid, and the gas checking device used by the Government is an infringement thereof.

The law secures the patentee against infringement by a use in other forms and proportions than those specifically described in the claims.

This court will not direct the Court of Claims to certify evidence and not its conclusions from the evidence. The rule is that the finding must be of the facts established by the evidence.

This court, in appeals from the Court of Claims, can only act upon the record; and a finding of that court that a definite amount of compensation is due from the Government for use of a patent, to which no objection is taken or exception reserved, is as finally determinative of the matter, as a special verdict of a jury. The evidence cannot be certified up so as to make such finding reviewable by this court. *United States* v. *New York Indians*, 173 U. S. 464, followed, and *Ceballos & Co.* v. *United States*, 214 U. S. 47, distinguished.

44 Ct. Cl. 610, affirmed.

THE facts, which involve the jurisdiction of the Court of Claims of claims of patentee of the De Bange gas check for use of that invention by the Government, whether there was such use and what the proper compensation should be therefor, are stated in the opinion.

Mr. Assistant Attorney General John Q. Thompson and *Mr. Malcolm A. Coles* for the United States.

Mr. Philip Mauro and *Mr. T. D. Merwin*, for appellee in No. 209 and appellant in No. 210.

MR. JUSTICE MCKENNA delivered the opinion of the court.

This suit is for royalties alleged to be due for the use by the Government of a certain patented invention known as a "gas check" or "obturator," a device applied to breech-loading cannon to prevent the escape of gas.

The Court of Claims rendered judgment against the United States for the sum of $136,000. Both parties appeal, the United States contending against any judgment, the claimant contending for the recovery of a larger sum. No further distinction is necessary to be observed between the appeals. The discussion of the case will dispose of both.

The first contention of the Government is that the facts

set out in the findings did not constitute an implied contract in fact as distinguished from a tort, and that, therefore, the Court of Claims had no jurisdiction of the case.

Such a contract is necessary to sustain the exercise of jurisdiction. *Russell* v. *United States*, 182 U. S. 516, and cases cited. The Court of Claims decided that such a contract existed and that the jurisdiction of the court was established, citing *United States* v. *Berdan Fire Arms Mfg. Company*, 156 U. S. 552. The court said: "The findings disclose an invitation to present the details of the patent to the defendant [the Government], its examination by a board of officers appointed to investigate such inventions, and its final use without the slightest claim of ownership. Nothing appears to show an intention to dispute claimant's title to the patent, hence an implied contract arose to pay for such use."

In discussing the correctness of these conclusions we necessarily assume the validity of the patent, its utility and use by the Government, the question being only for the present whether such use was a trespass upon the rights of the claimant, or in concession of such rights and of an obligation to pay for them.

The findings lack, and, it may be, necessarily lack, definiteness. They trace the history and progress of the invention of gas checks from an early period to the culmination in the patent to Colonel De Bange, an officer of the French army, in 1884, granted upon an application made in 1883. It immediately attracted the notice of American army and naval officers and received favorable commendation in ordnance notes.

In 1883, under an act of Congress of that year (March 3, 1883, 22 Stat. 472, 474), a board was constituted known as the "Gun Foundry Board," composed of eminent officers of the army and navy, headed by Rear Admiral Simpson of the navy, whose duty it was, among others, as it is recited in the findings, to report on the establish-

ment of a Government foundry, "'or what other method, if any, should be adopted for the manufacture of heavy ordnance adapted to modern warfare, for the use of the army and navy of the United States.'"

The board visited the claimant's works at Paris on June 29, 1883. "In the official report of this board reference is made to a visit to the claimant's works at Paris, France, on August 29, 1883, and to the inspection by said board of the De Bange system of ordnance. In the said report of said board is the following:

"'*Breech fermeture.*—All the French guns are breech-loading, and are fitted with the interrupted screw system, as modified by Colonel De Bange to suit his gas check.

"'*Gas check.*—The De Bange gas check is universally employed.'"

Prior to the visit of the Gun Foundry Board the De Bange obturator was brought directly to the attention of the United States ordnance authorities through Lieutenant Commander Chadwick, naval attaché at London, to whom De Bange explained his invention and who gave to Lieutenant Commander Folger of the Bureau of Ordnance, Navy Department, a detailed description of the gas check, with a description of the method of making it, furnished by De Bange, subsequently (July 5, 1883) forwarding to the department the device, accompanied by the following letter:

"Sir: I have the honor to forward herewith a De Bange 'obturator,' which was kindly presented on request by the French minister of war.

"I am, very respectfully, your obedient servant,

F. E. Chadwick,

Lt. Comdr., U. S. Navy, Naval Attaché.

"Commodore J. E. Walker,

U. S. Navy, Chief of Bureau of Navigation,

Navy Department, Washington."

In 1884 the ordnance officers of the United States, after experimenting with the De Bange device, adopted it for heavy ordnance (5-inch caliber and upward) and have used no other device since.

"The United States Government [we quote from the findings] has never disputed the title of claimant's assignor, Colonel De Bange, as inventor of the said invention; but, on the contrary, the said invention has, ever since its adoption, been known in the service of the United States as the 'De Bange gas check,' and is described by that name in the official reports of the Secretaries of War and of the Navy."

The findings contain certain correspondence which is relied on by the Government to sustain its contention, and, as it is not possible to condense it, it is given in full:

"PARIS, *June 29, 1891.*

Colonel De Bange to H. E., the Minister Plenipotentiary of the United States.

"MR. MINISTER: In order to respond to the desire expressed by your excellency in the letter which you have done me the honor to address to me, I add some details to my previous observations.

"One of my patents bears the number 331,618; it relates to gun carriages; it is not very important because one can do without it; but the second, No. 301,220, which is connected with the obturation of guns and breech mechanism is of the highest importance. Without my obturator the loading of a gun by the breech is difficult and the service is rendered ineffectual. The metallic ring used in Germany is far from having its value and imparts to the gun a considerable inferiority. Thus all the makers of cannon are led to employ my invention, either openly or in a disguised form, styled by them improvement. The War and Navy Departments at New York, which are well acquainted with the question, will certainly not contest

the truth of my assertions; they have under their eyes, on trial, guns which speak for themselves.

"This is not the first time that I have had to complain of my idea being borrowed without my knowledge in France or abroad. The English Government particularly had taken up my system, and without my having demanded anything had offered me twenty thousand pounds sterling to indemnify me. I refused this offer, it is true, but because as a French officer I ought not to aid in the arming of a power which I do not consider as friendly. In part, deprived of my assistance, England has copied me badly and possesses but a moderate artillery.

"In any case, I appeal to the sentiments of equity of the Government of the United States, convinced that it will recognize easily the justice of my claim.

"Pray accept, &c., &c.,

(Sgd.) Colonel De Bange.

"United States Legation,
Naval Attaché,
Paris, July 2nd 1891.

The Naval Attaché at London suggested in a communication to Mr. Reid, our Minister there, that Colonel De Bange's letter be forwarded to the Navy Department. The Minister, however, referred it to the Secretary of State.

De Bange sent the following letter to the Secretary of the Navy:

"Versailles, near Paris, 16/8/91.

"*Colonel De Bange to Monsieur Benjamin F. Tracy, Secretary of the Navy at Washington.*

"Mr. Secretary: Some months ago I addressed the United States minister at Paris, verbally and by writing, several remarks on the subject of loans which I had made of my invention to the departments of War and of the Navy; finally, as I have undertaken to write to you directly, I now have the honor to lay before you the following:

"I had taken out letters patent, which treated of artillery in the United States, one number, 301,220, relative to l'obturation of guns, and of principal importance; the other number, 331,618, relative to the carriage.

"Furthermore, I have seen at Paris many of your officers to whom I furnished without reserve all the information which they have asked of me.

"Under these circumstances I hope that if the Government has desired to utilize my inventions, it will inform me; there has been no defect, and I have learned from a reliable source that my system was copied, unknown to me, by the departments of War and of the Navy, be it under the disguise of an improvement or be it openly.

"I regret that this has occurred, but in any case I consider that an indemnity is due me. If you will have the kindness to notify the Government of my claim, I am confident that it will see that justice is accorded me in the indemnity to which I believe myself to be entitled.

"Please accept, Mr. Secretary, the expression of sentiments of highest consideration, with which I am

"Your obedient servant,

"De Bange.

"Please reply.

This letter seems also to have been sent to the Department of State and referrred by it to the Secretary of the Navy, as appears from the following letter of the Chief of the Bureau of Ordnance:

"Bureau of Ordnance, *August 27, 1891.*

"Respectfully returned to the honorable Secretary of the Navy.

"The bureau has not manufactured and is not using any gun carriages which contain principles which could be held as infringing any claims secured in United States patent No. 331,618. The gas check which has been adopted for the naval guns of 6-in. calibre and upwards

resembles in certain features that described in United States patent No. 301,220, issued to Col. De Bange. It also differs from it materially in particulars which are original in this bureau.

"I am not in position to give an opinion as to the question of infringement, and have to suggest that the applicant refer the matter to the Court of Claims.

"The bureau will note for the information of the applicant that there are no funds appropriated or available for the payment of any claim that might be allowed by the Court of Claims, and that it will be necessary for the applicant to go to Congress for relief in the event of a decision being obtained which will warrant such action.

(Sgd.) WM. M. FOLGER,
Chief Bureau of Ordnance."

The Navy Department then addressed the Secretary of State as follows:

"NAVY DEPARTMENT,
"*Washington, September 3, 1891.*

"SIR: I have the honor to acknowledge the receipt of your communication of the 20th ultimo, enclosing copies of correspondence relating to a claim of Colonel De Bange, a retired officer of the French army, residing in Paris, France, who alleges the use by this Government of certain inventions patented by him in guns and gun carriages.

"In reply I have to state that the Chief of the Bureau of Ordnance, in this department, to whom the communication and accompanying papers were referred, reports as follows:

"'The bureau has not manufactured, and is not using, any gun carriages which contain principles which could be held as infringing any claims described in U. S. patent No. 331,618.

"'The gas check which has been adopted for the naval guns of 6-inch calibre and upwards resembles in certain

features that described in U. S. patent 301,220, issued to Colonel De Bange. It also differs from it materially in particulars which were original in this bureau.'

"In view of the statement made by the Chief of the Bureau of Ordnance, there appears to be no proper ground for the claim of Colonel De Bange.

"Very respectfully,

F. M. RAMSEY,

"Acting Secretary of the Navy.

"The Honorable the SECRETARY OF STATE."

On January 31, 1894, the claimant, by its attorneys addressed substantially similar letters to the Secretary of War and the Secretary of the Navy, stating its claim for the use of its patented invention and requesting payment for the use of it. The letters described and extolled the device and stated that they "deemed it expedient to take a low average price and apply it to all guns." They fixed such price at $200 per gun.

The Secretary of the Navy, on February 10, 1894, in replying, referred to and quoted from the department's letter of August 20, 1891, and added: "As the status of the case has not been changed since the date of the department's letter above mentioned, and as the matter has been previously disposed of by the department, no further consideration of the case appears to be required."

The letter of the claimant's attorneys, however, was the subject of a report and recommendation by the Chief of Bureau of Ordnance, which resulted in the following letters:

"BUREAU OF ORDNANCE,

December 4, 1894.

"Respectfully returned to the department.

"The gas check applied to guns constructed for the navy is that illustrated in United States Letters Patent No. 318,093, of May 10, 1885, and so far as this patent

is valid no royalties should be paid. (See Court of Claims Reports, p. 334, vol. 23, 1887–88.) If, however, as the bureau believes to be the case, the above-mentioned patent is only valid so far as it covers improvements on the De Bange patent (No. 301,220, of July 1, 1884), then, so far as the latter patent is valid, the within claim for royalties, in the bureau's opinion, is a proper one, and would be maintained by the courts.

"It must be noted, however, that until recently there has been no authority of law for the payment of royalties out of the naval appropriations, and the manufacture of most of the gas checks in question had been completed prior to the legislation giving such authority. Moreover, the bureau is of opinion that the Davis patent (No. 318,093, of May 19, 1885) covers real and important improvements, without which it is doubtful if the De Bange system would have been adopted for United States naval guns, and consequently it will be necessary to decide as to the relative values of the device in its original and improved forms. The fact that practically the same gas check is in use in all United States army guns of recent construction, and is being applied to guns now being made by the Bethlehem Iron Company, under contract with the War Department, should also be considered, since independent action on the part of the Navy Department might easily be against the interests of the Government.

"It is therefore recommended that an investigation be made in regard to the De Bange patent, and if this patent is concluded to be valid that the War Department be consulted as to whether a definite sum, to be fixed upon either by a board or in some other way, should not be offered the claimants for the right on the part of the Government to use the device in question on all its guns.

"W. T. SAMPSON.

"*Chief of Bureau of Ordnance.*"

The final action of the Navy Department upon petitioner's claim was communicated to the petitioner in a letter of the Secretary of the Navy, dated December 31, 1894, as follows:

"NAVY DEPARTMENT,
"*Washington, December 31, 1894.*

"GENTLEMEN: The department has carefully considered the questions presented in the brief filed by you, as well as in former correspondence, relative to the matter of the claim of the Société Anonyme des Anciens Etablissements Cail for compensation for the use by the United States of a gas check invented by Col. Charles T. W. V. De Bange, of the French army.

"It appears that the matter is now in such a condition that it will in all probability involve not only questions arising under the patent issued to Colonel De Bange, but also those growing out of the claims and affecting the rights of other patentees. Under these circumstances the department is of opinion that the full consideration and determination of these questions can be more certainly and equitably reached and the rights of all the parties concerned, as well as the Government, more definitely ascertained and assured through the medium of a court of justice. It is therefore suggested that the necessary proceedings for the consideration and adjustment of the matter by the Court of Claims be instituted.

"Very respectfully,
"H. A. HERBERT, *Secretary.*

"Messrs. POLLOCK & MAURO,
"*Attorneys at Law, Washington, D. C.*"

The final action of the War Department was communicated to claimant's attorneys in a letter dated January 14, 1895, in which the language and suggestion of the Secretary of the Navy were adopted substantially verbatim.

It is not possible to review the arguments by which the claimant asserts and the Government denies the sufficiency of the facts as we have related them to constitute an implied contract between the claimant and the Government. The ultimate contention of the Government is that the mere use of the patentee's invention with his knowledge does not create an implied contract in fact to pay for such use, but "there must be (1) a use of it with the patentee's assent, and there must *also* be (2) an *agreement* or *meeting of minds* on the part of the patentee and on the part of the user *as to compensation for the use*, even though the amount of the compensation be not fixed." These elements, it is insisted, were present in the *Berdan Case*, which we have seen was relied on by the Court of Claims; they are, it is further insisted, absent in the case at bar.

But these elements do not have to appear by the explicit declaration of the parties. They may be collected from their conduct. The alternative of a contract is important to be kept in mind. The officers of the Government knew of the De Bange invention and were aware of its great importance, and the purpose to deliberately take property of another without the intention that he should be compensated—in other words, to do plainly a wrongful act—cannot be imputed to them without the most convincing proof. Such proof does not exist in the present case. On the contrary, the record shows that compensation was contemplated. There was doubt as to the extent of it because there was doubt as to how far the devices used were attributable to or belonged to De Bange or whether they constituted an infringement of his patent, and therefore there was hesitancy and doubt, not as to compensation, but as to the amount and extent of it.

We agree with the Court of Claims that there is resemblance between this case and the *Berdan Case*. In that case the court had no difficulty in adducing the assent of Berdan to the use of his invention. The court

found more difficulty in inferring the assent of the Government. The court said, by Mr. Justice Brewer: "While the findings are not specific and emphatic as to the assent of the Government to the terms of any contract, yet we think they are sufficient. There was certainly no denial of the patentee's rights to the invention; no assertion on the part of the Government that the patent was wrongfully issued; no claim of the right to use the invention regardless of the patent; no disregard of all claims of the patentee, and no use in spite of protest or remonstrance. Negatively, at least, the findings are clear. The Government used the invention with the consent and express permission of the owner, and it did not, while so using it, repudiate the title of such owner."

Like comment may be made of the facts in the case at bar. It is true that the letter of William F. Folger, Chief of the Bureau of Ordnance, stated that while the gas check used by the Government resembled in certain features De Bange's gas check, it differed from it materially in particulars which were original in the bureau. But this was not a denial of the use or the utility of De Bange's invention. Whether there was infringement the officer did not decide, but suggested that the "applicant refer the matter to the Court of Claims." Subsequently the Acting Secretary of the Navy did deny infringement. But that position was abandoned and the Secretaries of War and the Navy "suggested that the necessary proceedings for the consideration of the adjustment of the matter by the Court of Claims be instituted." There were parallel circumstances in the *Berdan Case*.

The invention of Berdan was an "extractor-ejector" for use in breech-loading rifles, and that which was used by the Government was devised by one of its employés. There was a difference between it and Berdan's device, but the officers of the Government doubted if the difference was material, and concluded that it was a mat-

ter for the courts to decide. It is true there was no a sertion of right against the Berdan device in consequen of the difference between it and the device used by th Government as, it may be said, there was in the case bar by the letter of Admiral Ramsey of September 3, 189 But the position taken in that letter was, as we have see abandoned, and it was declared that so far as the De Bang patent was valid its claim for royalties was, in the opinio of the Bureau of Ordnance, a proper one and would b sustained by the courts. This was in 1894. Prior to tha time and afterwards the Government continued to use th device. We think the Court of Claims had jurisdictio

The Government contends that it has not infringe the De Bange patent. Infringement is a question of fac and as an aid to its solution courts are furnished usuall with an expert comparison of the contending device their identity or difference of construction and modes operation. This record is destitute of such testimon The Government contends for the very narrow constru tion of the patent based on its claims and the prior ar The only proof of the prior art, however, is a reference t thirteen or fourteen patents by number and patente some of which are English, some French and some Amer can. The only explanation of them is in the argumen of counsel and an exhibition of the patents. It is ver doubtful if we may take notice of even the America patents; more doubtful if we may of the foreign one We, however, have considered counsel's explanation c them. They reveal nothing material to be considere that the findings of the Court of Claims do not show c the prior art and the progress from its failure to the suc cess of the De Bange invention, a success, it may be con ceded, that availed itself of all that the prior art demon strated, but went beyond it to the fulfillment that it ha not achieved.

The necessity of a gas check to the success of breech

loading guns all could see, and what a device, to be successful, must do; but the world struggled a long time with the problem, and that problem was to find something which would stand the intense heat generated and the great force caused by the explosion of the powder in a high power gun and the backward escape of the resultant gas under the enormous pressure exerted, and this not in one service of the gun, but in many services. The experiments are detailed in the findings. Metallic cups were tried and paper cups. As early as 1858 India rubber was suggested. Its elasticity, it was thought, would afford all that was necessary for a complete automatic obturation, the gas by its expansion "to seal its own escape."

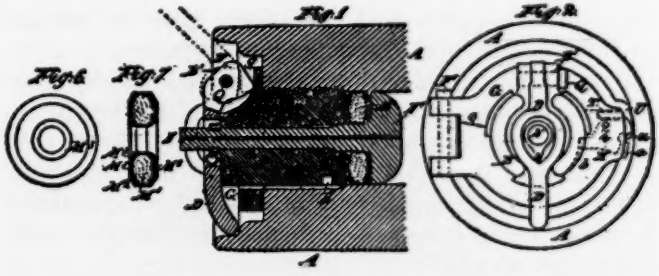
Rubber had some success when constructed in rings of varying degrees of suppleness and hardness, and seemed to have settled the problem. But defects subsequently developed and experiments continued for something better and which would fulfill all the conditions. Then soap obturators were tried, and finally Colonel De Bange's invention of tallow and asbestos. If our purpose was speculative, not practical, we might pause to wonder how such substances could produce such results under the conditions to which they are subjected, and by wondering we express in a way the quality of the invention. We are told by the findings of the Court of Claims that a gas check "is subject to a pressure of from 30,000 to 40,000 pounds per square inch, to very high temperatures, to the effects of corrosive gases, and the effects of rapid and violent shocks."

We need not, however, dwell longer on the excellence of the invention. The Government has testified to its excellence by using it in the guns intended for the national defense.

But it is contended that the claim of the patent is for a specific combination of elements and that that combination of elements is not used by the Government.

This contention is based upon what is considered to be the proper construction of claim 1 of the patent, a strict construction being urged of it—indeed, as we understand the argument, the claim must be confined to the specific forms of its elements, giving the widest latitude to imitation.

The patent answers the contention. Describing his invention, De Bange calls it "certain new and useful improvements in breech-loading guns." Specifying the improvements, he says that they "apply to breech-loading guns which employ a screw-plug having its threads interrupted." Further specifying, he adds: "I have devised a system of packing placed in advance of the plug, and which is expanded by the force of the explosion of the powder to make a tight joint to prevent the leakage of gas." He declares the drawings form a part of the specification and represent what he considers the best means of carrying out the invention. It is only necessary to give Figures 1, 2, 6 and 7.



They are described in the patent as follows: "Figure 1 is a central longitudinal section. The strong lines show the parts ready for firing. The dotted lines show the transverse lever in a position for conveniently operating to turn the screw-plug. Fig. 2 is a rear view showing the parts locked. Fig. 3 is a corresponding view showing

the parts unlocked. . . . Figs. 6 and 7 represent the packing-ring detached. Fig. 6 is a face view, and Fig. 7 a section in the plane of the axis." The specification then proceeds as follows:

"A liberal hole in the line of the axis of the screw-plug B carries a stout sliding pin, N, at the extreme front of which is a stout head, N'. The portion of the body adjacent to the head N' is slightly enlarged. The head N' is adapted to receive the force of the powder at the discharge. At the moment of the discharge this head moves backward, compressing a relatively soft and expansible packing-ring, M, behind it. Certain portions of this ring will be distinguished, when necessary, by additional marks, as M' M^2. The body M' of this packing is of asbestos saturated with tallow, and affords a sufficiently yielding mass with the required capacity for enduring heat and for withstanding the very strong compressive force to which it is subjected by the discharge. It is inclosed between two thin shells, M^2 M^2, of copper, one fitting the body M' on the inner and the other on the outer side, and nearly incasing the entire packing. Both the body M' and the copper M^2 are then inclosed between two strong shells of brass, M^3 M^3. The entire packing thus made is adapted to maintain its form, but to allow a small amount of radial expansion sufficient to pack the joint tightly against the escape of gas. This expansion is due to two causes—the tapering form of the front end of the pin N, which acts on the interior of the packing, and the powerful compression received from the head N'. The expansion from one or both causes is sufficient to press the exterior of the copper M^2 tightly against the interior of the gun, thus effectually preventing any leakage of gas."

Claim 1 is the important one and is as follows:

"1. The partially-threaded plug B, headed pin N N', extending through said plug, and the yielding packing M,

arranged between the head N′ and the inner end of the plug, in combination with each other and with the gun A, arranged as shown, to allow the pin to be driven rearward and compress the packing, as herein specified."

It will be observed, therefore, that De Bange declared that what he devised was a "system of packing" which by the force of the explosion of the powder is expanded to make a tight joint to prevent the leakage of gas. The mechanical parts are but aids to this result, securing in place the packing and enabling its qualities to operate, enabling it to maintain its form but to allow radial expansion sufficient "to pack the joint tightly against the escape of gas." This expansion has also the effect of pressing "the copper (M^2)" against the interior of the gun and coöperates to prevent the leakage of gas.

That this packing constitutes the very essence of the invention is declared in all of the literature on the subject and recognized in all of the Government publications. The Government now contends for a limitation of it, and insists that it consists of "a yielding packing M," exactly as described, although the description is declared by De Bange to represent "the best means of carrying out his invention," and he declares also that "modifications could be used in the forms and proportions."

We cannot therefore assent to the contention of the Government, and in rejecting it we do not render "the claim elastic and indefinite where it should be certain." We preserve that which was declared to be and which has always been recognized to be the invention, and by those competent to declare, whose duty it was to comprehend and estimate, not only the result achieved but by what achieved.

In the description furnished by De Bange to Commander Chadwick a covering of cloth is described. The description in the Ordnance Notes of April 20, 1883, mentions "plates of tin, strengthened at the edges by thin brass

rings." Another description speaks of "a metallic split ring." These are but details. As said by the Court of Claims, through Booth, J., "The invention described by the language of the claim was the yielding pad of asbestos and tallow." And this, the learned Judge also said, predominates as the one "central idea" in every description of the patent in either the specifications or claim.

We learn from the court that it heard much expert testimony, and in its opinion it considers two subsequent patents expressed to be improvements on the De Bange patent. One of these was issued to James B. Davis and the other to Gregory Gerdom. The difference between them and the De Bange patent was commented on, and it was said that the record disclosed that in all inventions subsequent to De Bange's "the pad of asbestos and tallow is the functioning element of the device, without which its utility is as nothing," and that a pad of that composition supplied "the necessary expansion, indispensable to forward the operation of both the Davis and Gerdom patents. The United States used the Gerdom patent and paid him substantial royalities for its use."

It would seem, therefore, that the contention of the Government turns upon a question of fact found against it by the court below; that is, it was found that the particular envelope of the tallow and asbestos pad were not essential features of De Bange's invention, and that the substitution of steel rings for brass rings could be an infringement of the invention. As said by counsel for claimant, claim 1 "does not recite among its elements the materials whereof the envelope [of the pad] and rings are made. . . . It is, on the contrary, obvious that any suitable material may be used for these subsidiary parts." It is conceded that the pliable copper envelope (M^2) may be properly regarded as a part of the "yielding packing." The patentee so states, but he does not say that the "strong shells of brass M^3 M^3 are parts" of it.

It would indeed be arbitrary, as said by claimant, to read into the claim the specific metal of which those shells are composed "for no other purpose than to render it [the claim] worthless."

We have seen De Bange describe what he conceived to be the best form of his invention, and contemplated that it could be represented in other forms and proportions. This, however, was unnecessary, for the law would secure him against imitation by other forms and proportions. *Winans* v. *Denmead*, 15 How. 330; *Hotchkiss* v. *Greenwood*, 11 How. 248, 265; *Western Electric Co.* v. *La Rue*, 139 U. S. 601, 608.

We think, therefore, that the Court of Claims rightfully decided the question of infringement against the Government.

The cross-appeal of claimant is directed to the question of damages.

In the original petition filed by it on January 31, 1895, damages were laid at $140,000. There was no traverse filed until October, 1907. An amended petition was filed April 12, 1909, and judgment was prayed for $1,447,667.98. In this petition it was alleged that the invention was used upon 1,518 guns of various calibers within the six years next preceding the filing of the original petition, the number which was used by the army and that used by the navy being given. The total cost of the guns was stated to be $18,226,263. There is no finding responding to these allegations. The opinion of the court was filed December 2, 1907, that is, before the filing of the amended petition. The opinion contains the following statement: "There is no testimony in the record upon which the quantum of damages can be predicated. The measure of damages would be the value of the device to the defendants. Following the precedents heretofore established, the case will stand upon the docket, with leave to furnish testimony upon this point."

On the twentieth of May, 1909, judgment was rendered for claimant in the sum of $136,000. Each party moved for an amendment to the findings, which were overruled in part and allowed in part. The former findings were withdrawn and amended findings of fact filed. No exception appears to have been taken to this action. Indeed, the record does not furnish us with a comparison between the findings which were withdrawn and those filed. There is nothing to show upon what the court's ruling was invoked.

A motion was presented to this court April 25, 1910, to remand the case to the Court of Claims, and that that court be instructed to find and certify as matters of fact, in addition to the facts found, in regard to the cost of the guns in which the De Bange obturators were used, the amount the Government paid or contracted to pay for patented improvements in breech-loading mechanism for ordnance, and whether there appears in the record the testimony of experts as to the value of the De Bange device, or what would be a reasonable compensation for its use, and, if so, to state the amounts of such estimates.

It was further moved that the Court of Claims be instructed to strike out certain matters in the findings which were described to be evidentiary. The motion was postponed to the hearing, and is now to be considered. The motion is, in effect, for a direction to the Court of Claims to certify the evidence to this court, and not its conclusions from the evidence. This is clearly in contravention of the rule of this court which requires the record on appeal from the Court of Claims to contain a finding by the court "of the facts in the case established by the evidence in the nature of a special verdict, but not the evidence establishing it."

Besides, as we have seen, the record does not disclose what ruling was invoked. We can only act upon the

record, and that shows a finding of the court upon the question of compensation, to which finding there was no objection taken nor exception reserved. The finding determines the matter, being in the nature of a special verdict of a jury. *United States* v. *New York Indians*, 173 U. S. 464.

Ceballos & Co. v. *United States*, 214 U. S. 47, is not applicable. There was a contract of which there could be no dispute, and therefore a motion to embrace it in the record from the Court of Claims was granted and the case reviewed in the light thereof.

The motion to remand the case is therefore denied.

Judgment affirmed.